

Figure 28B

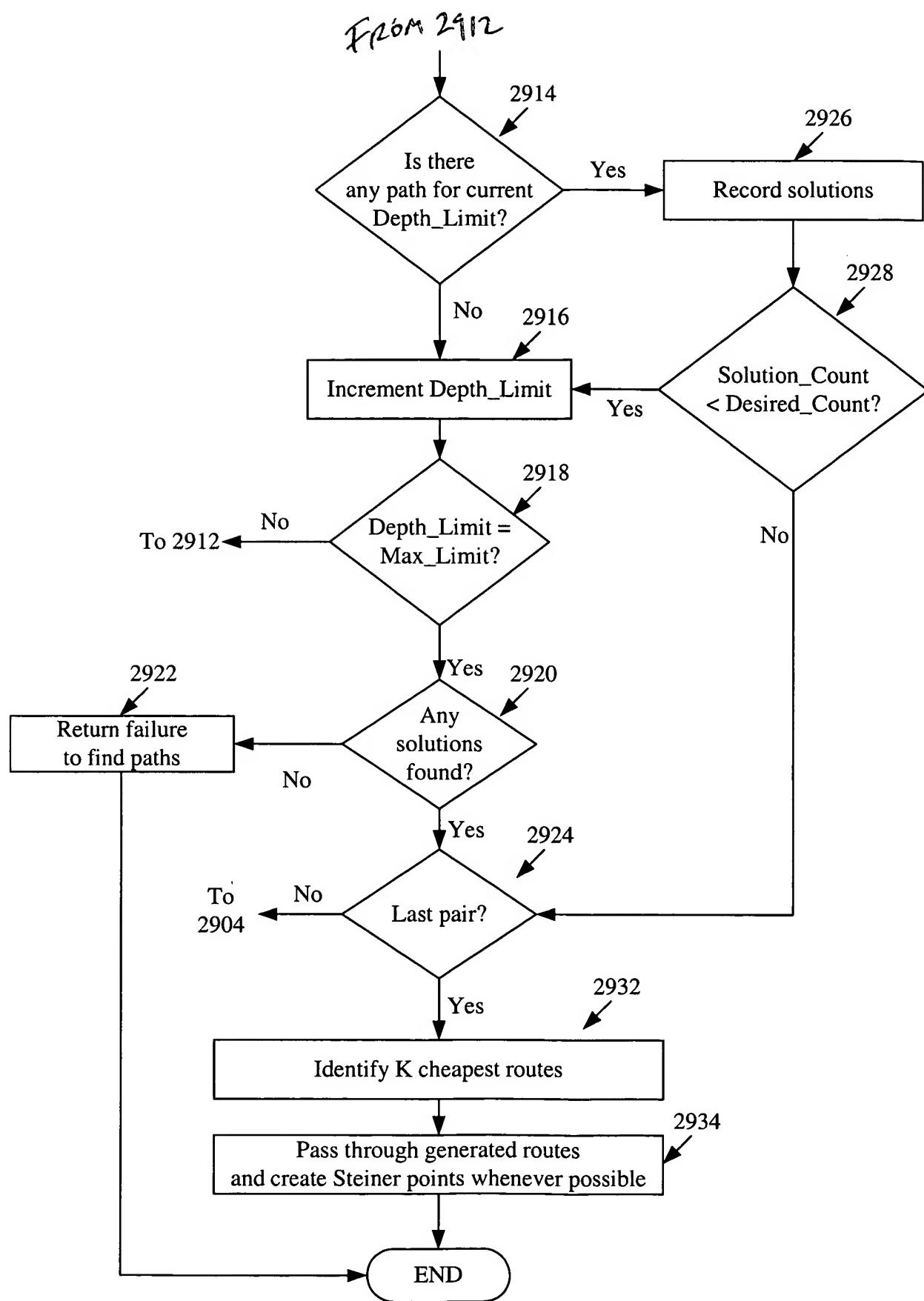
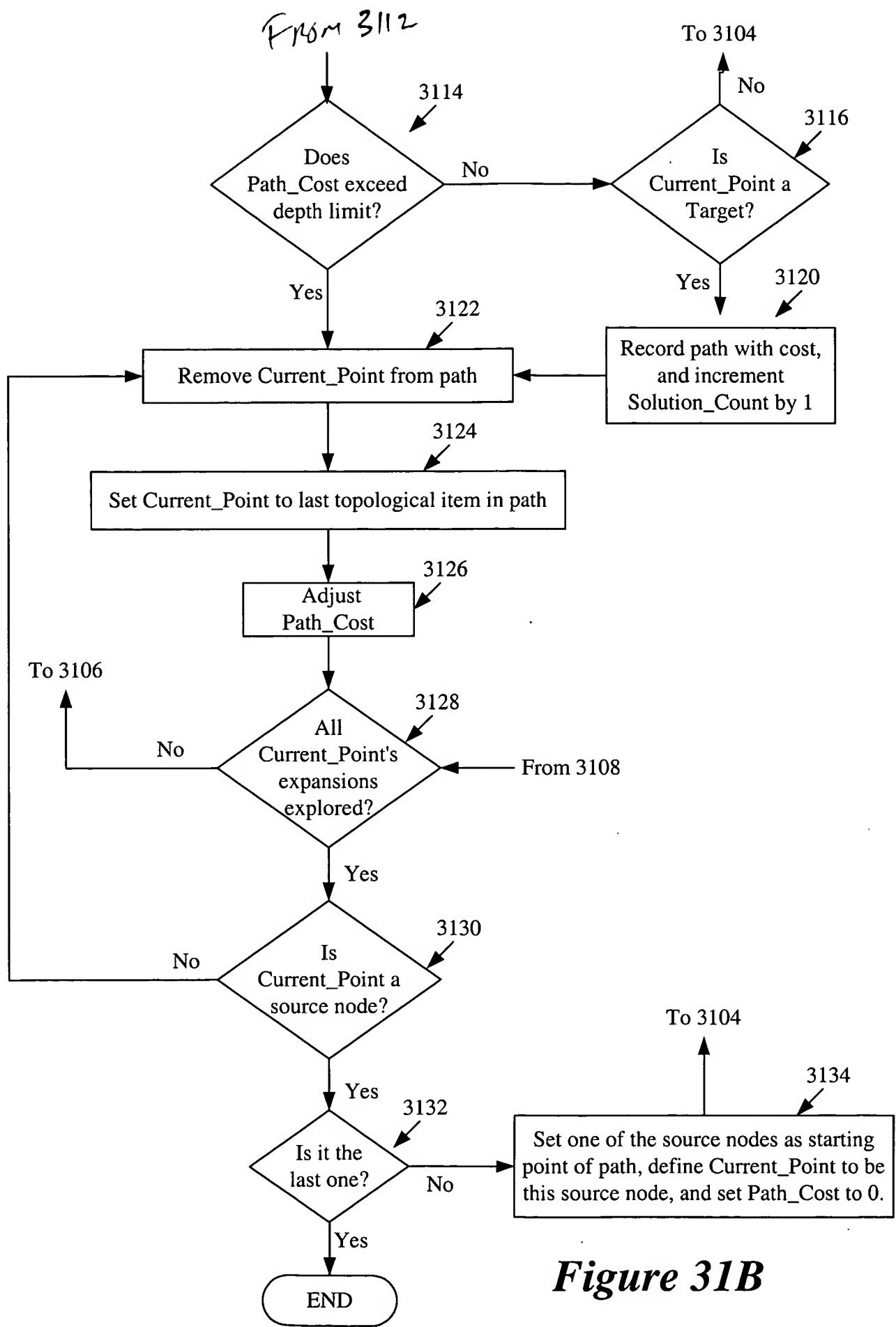


Figure 29B



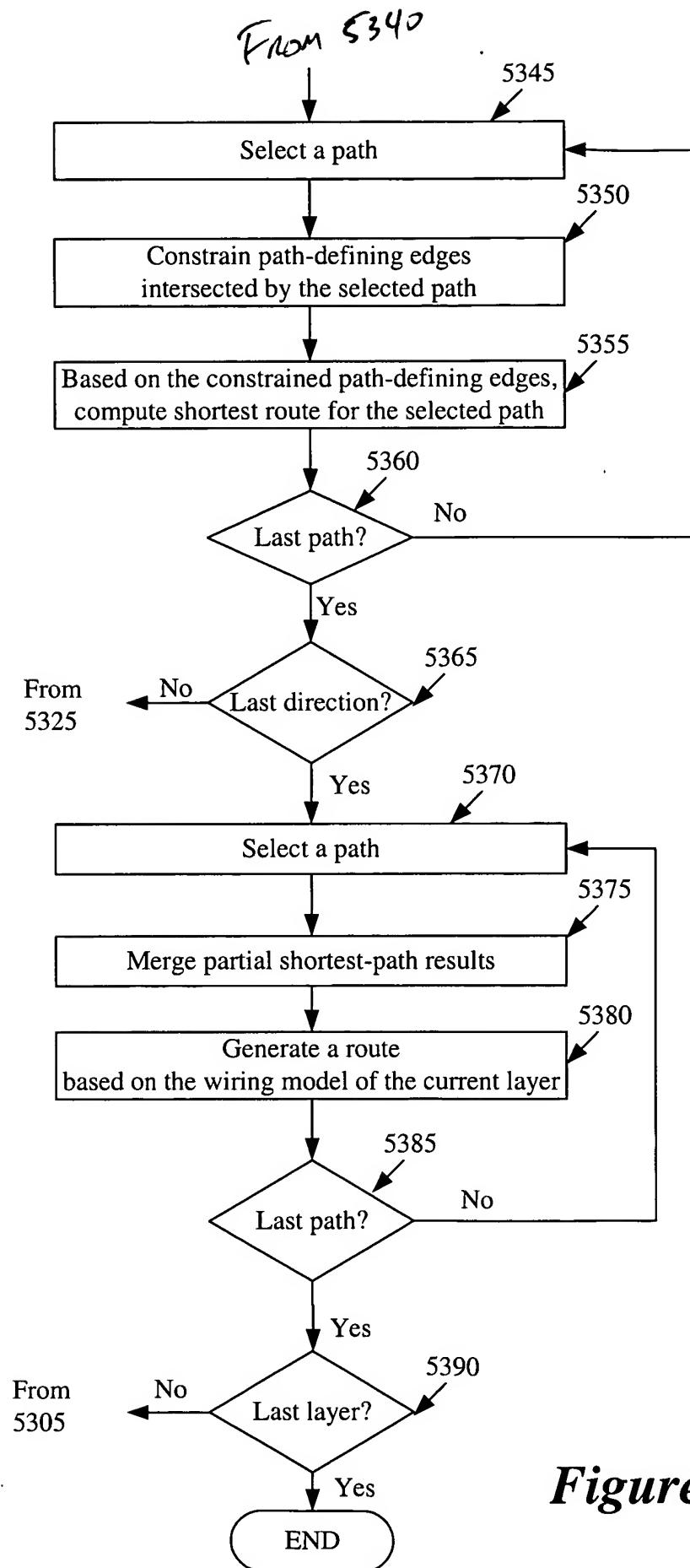


Figure 53B

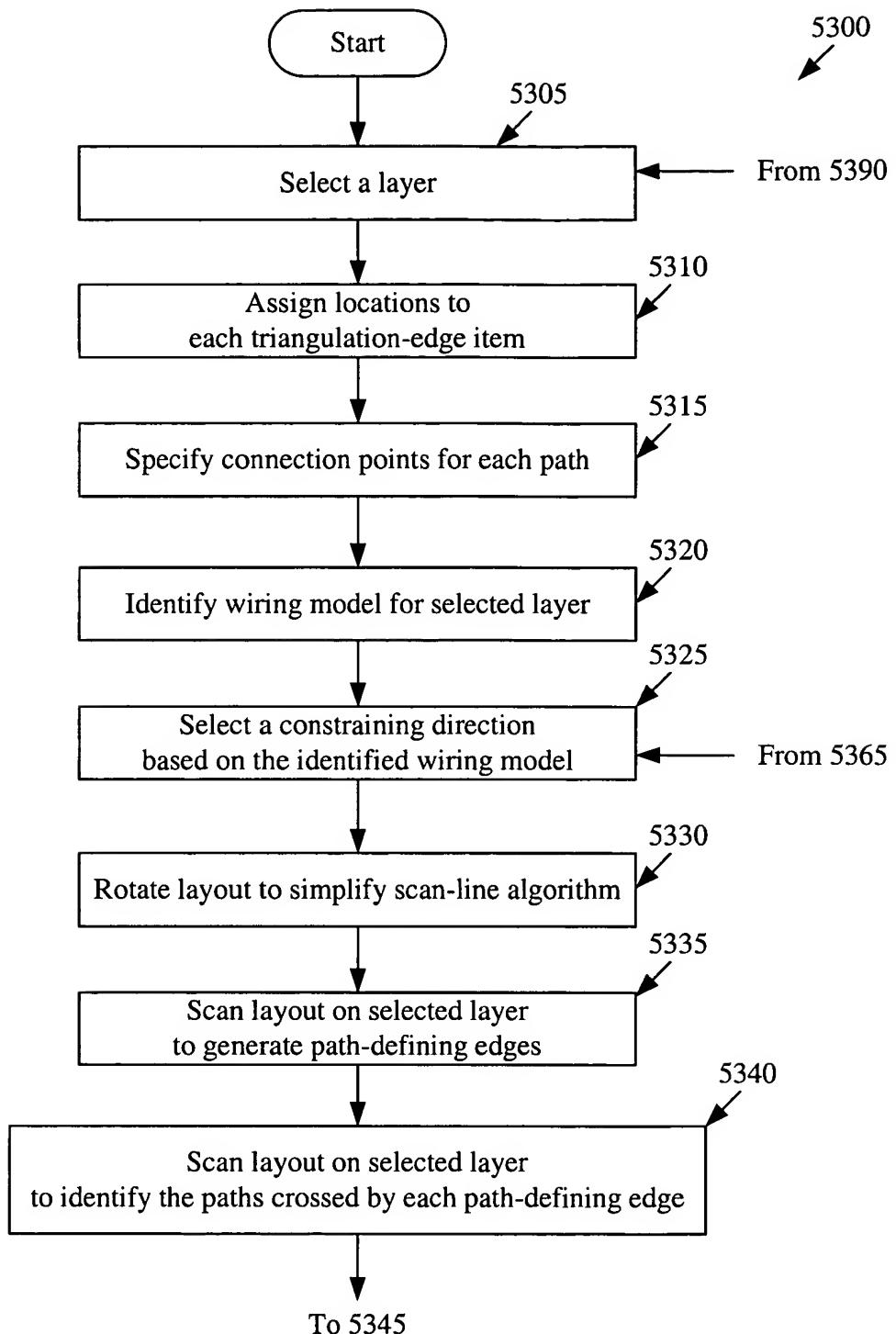


Figure 53A

*Figure 53: Figure 53A
Figure 53B*

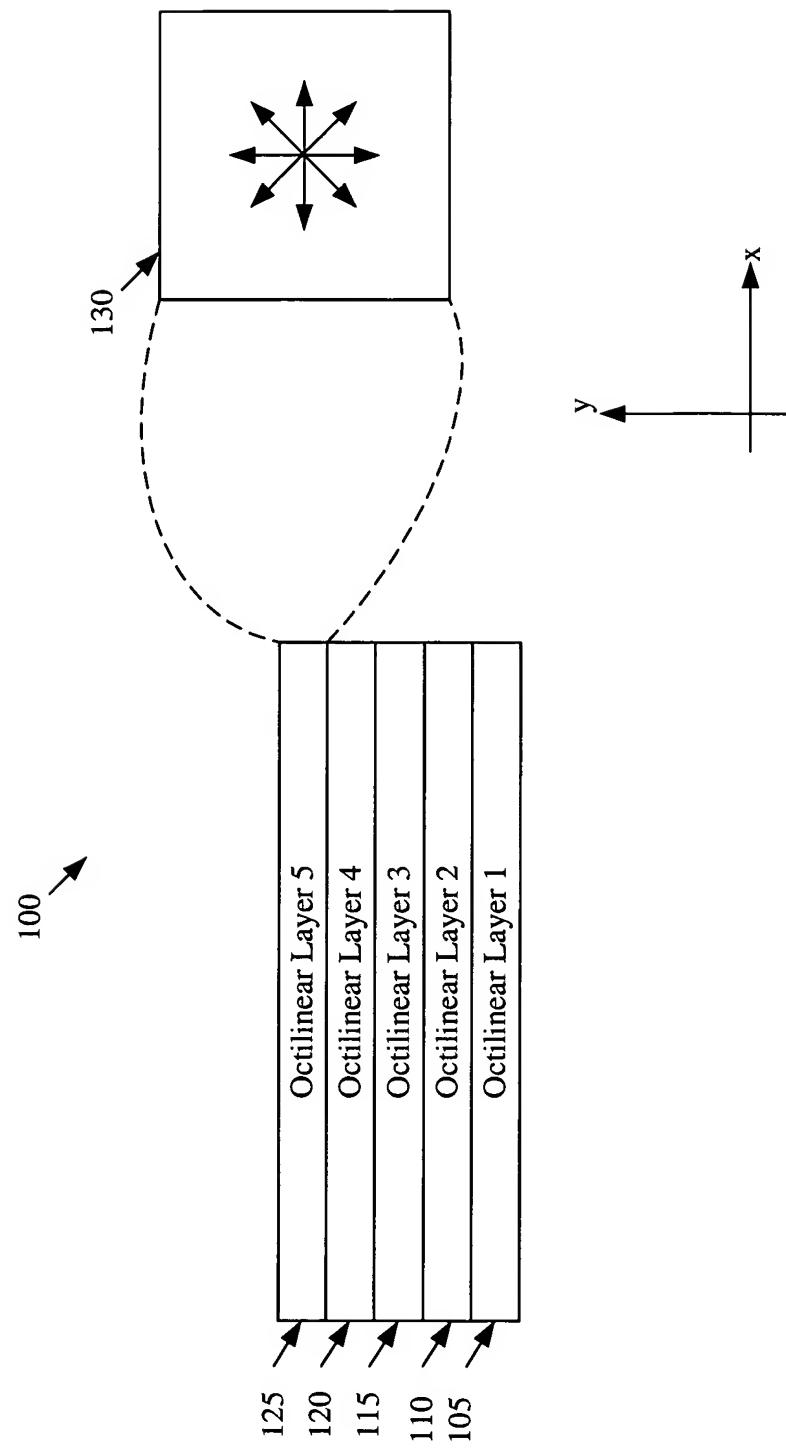


Figure 1

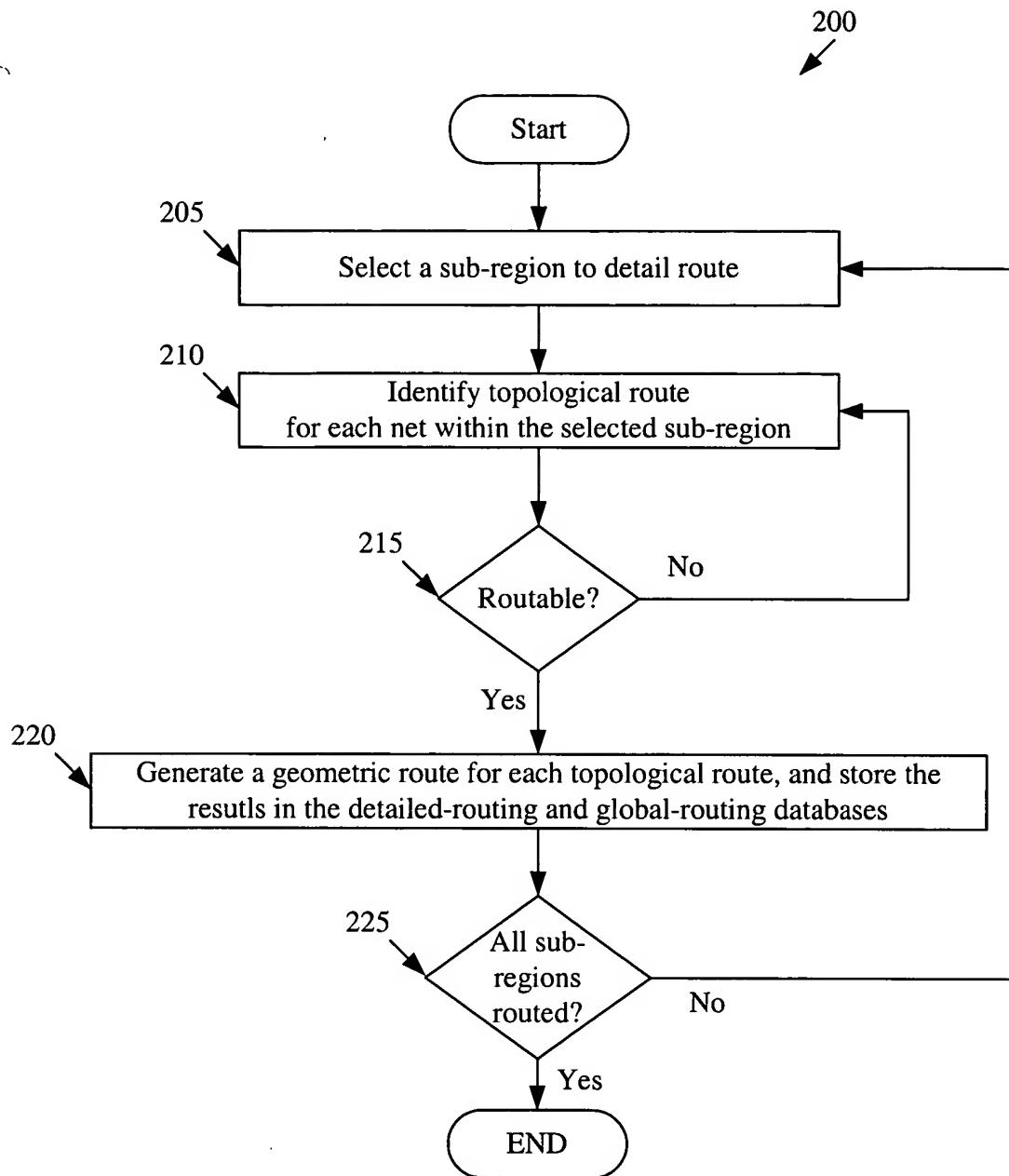


Figure 2

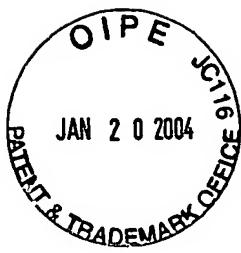
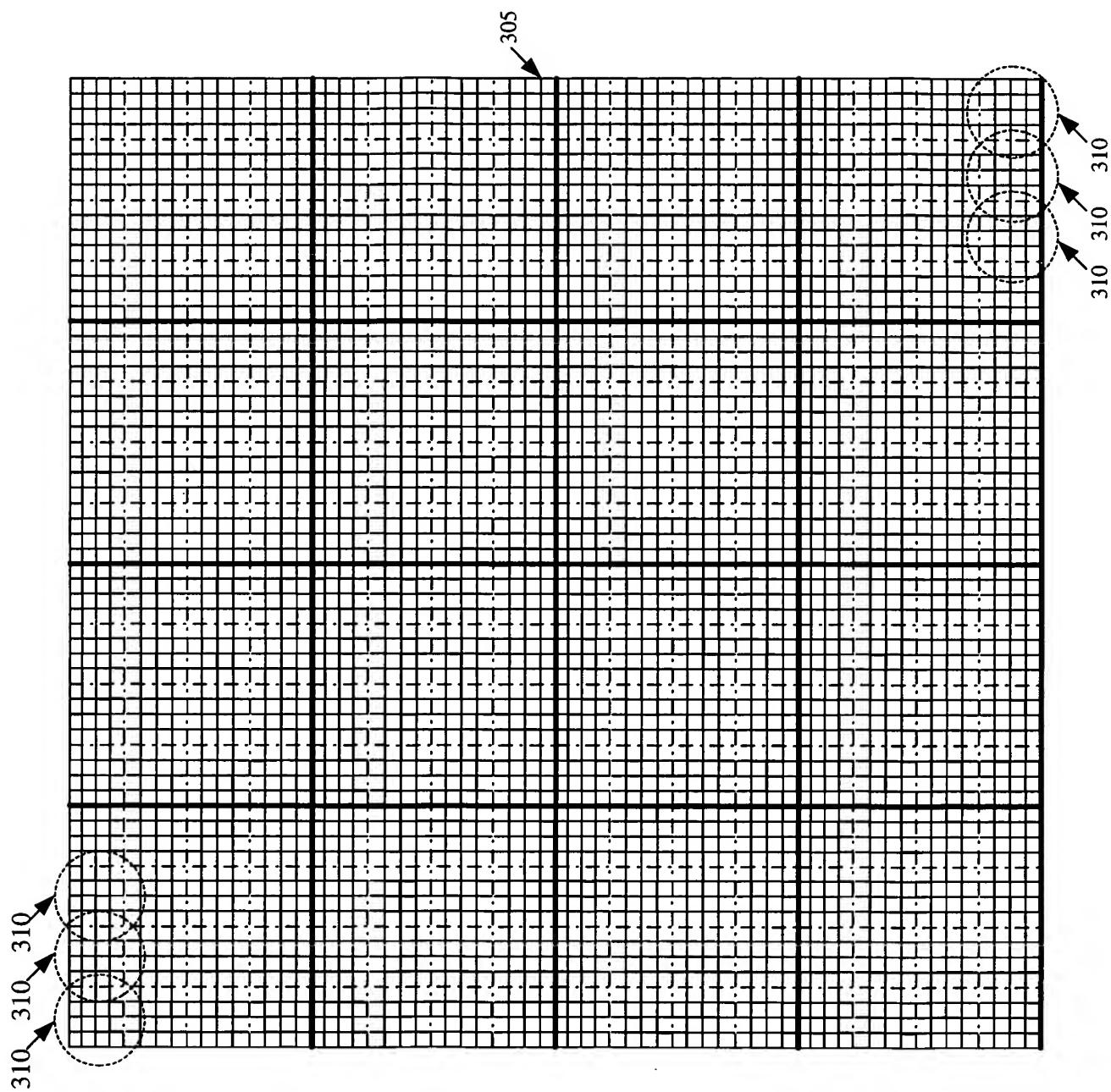


Figure 3



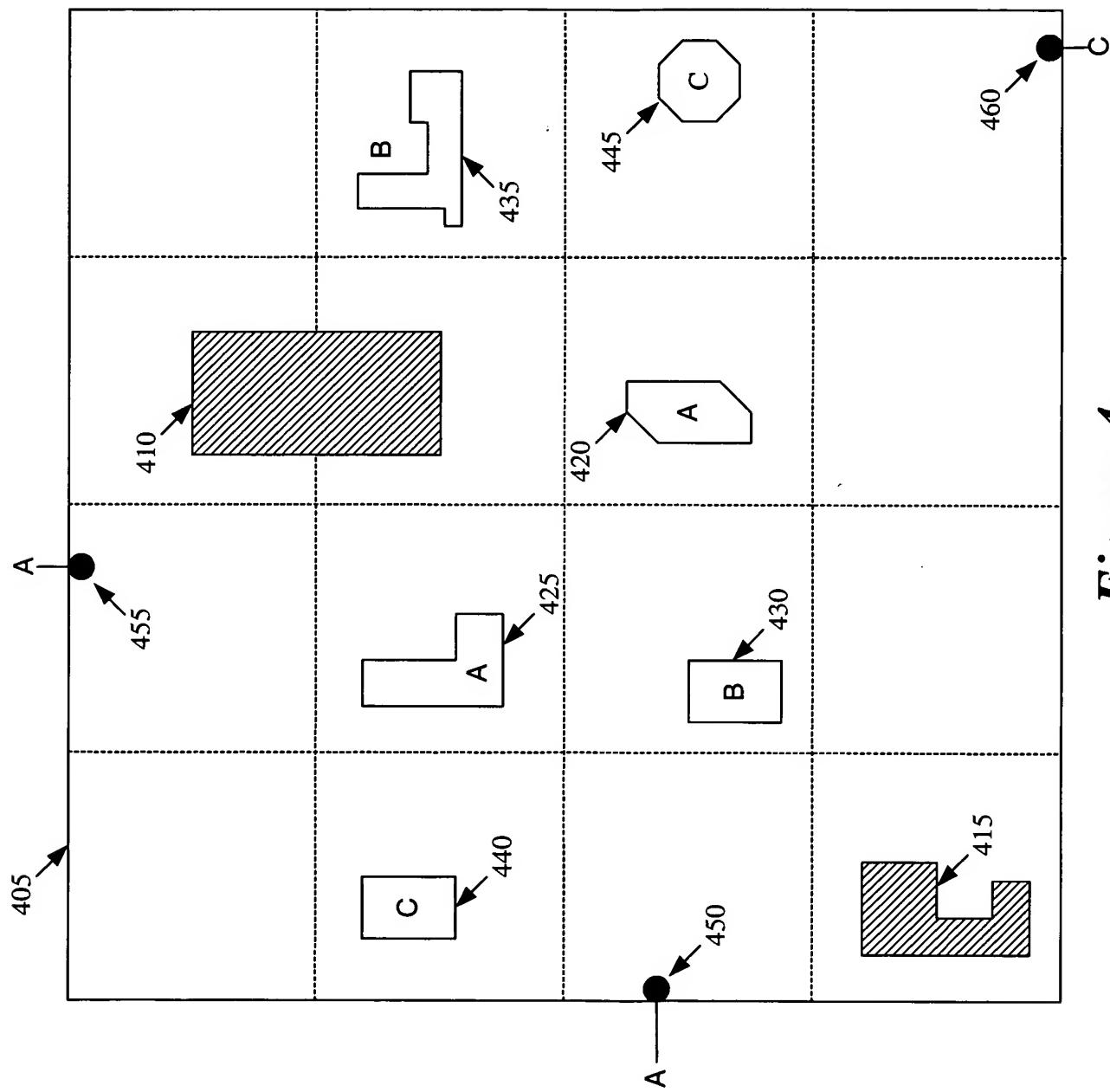


Figure 4

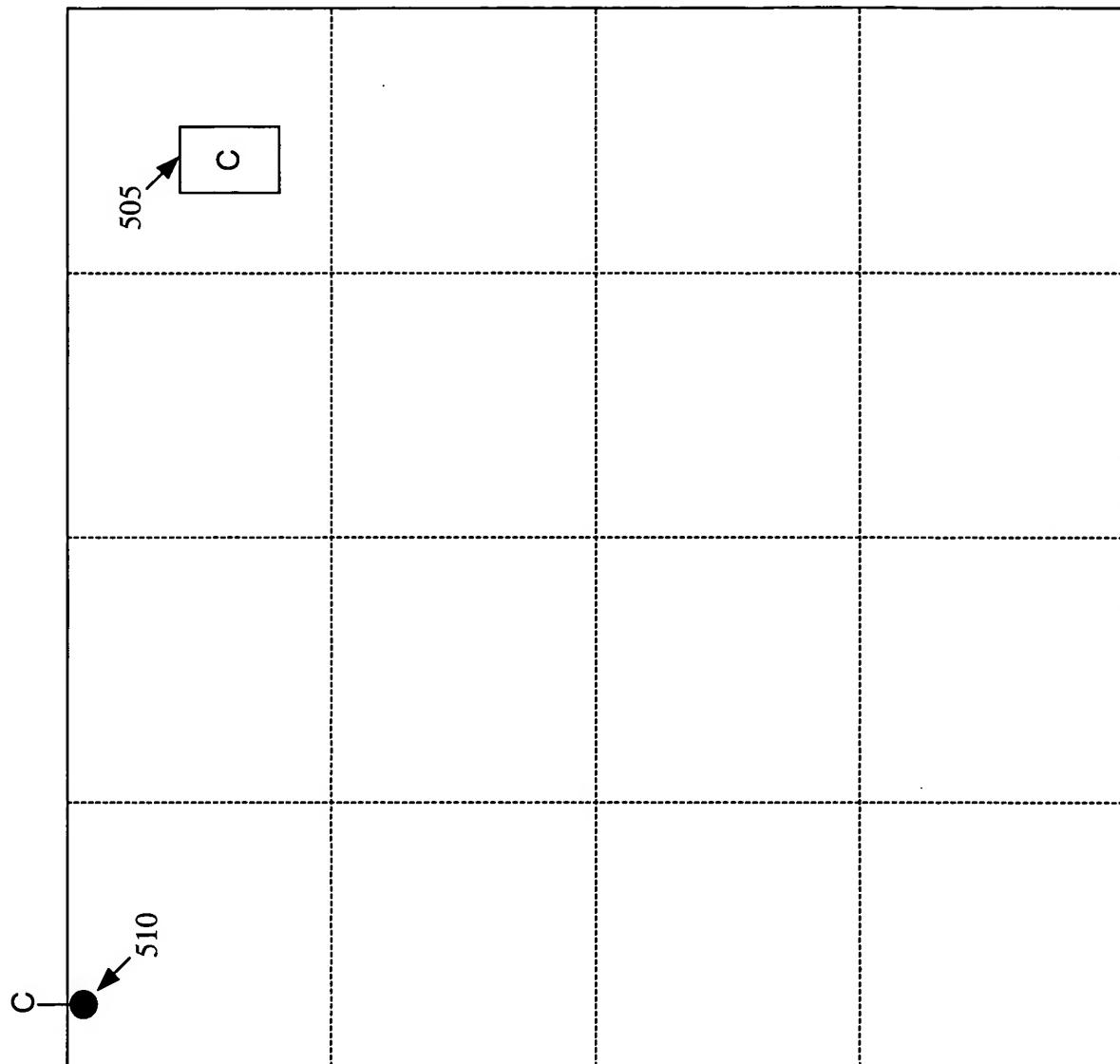


Figure 5



Figure 6

- List of Geometries
 - Each Geometry including a sequence of points & layer assignment
 - Bounding box of the region
 - Array of layer properties
 - Minimum wire size
 - Minimum spacing
 - Via sizes
 - Cost/Unit
- Netlist specifying a number of nets
 - Each net specifying a set of pins
 - Each pin specifying a set of ports
 - Each port specifying a set of geometries

Figure 7

- List of Geometries
 - Each Geometry including a sequence of points & layer assignment
 - Bounding box of the region
 - Array of layer properties
 - Minimum wire size
 - Minimum spacing
 - Via sizes
 - Cost/Unit
- Netlist specifying a number of nets
 - Each net specifying a set of pins
 - Each pin specifying a set of ports
 - Each port specifying a set of geometries
- For each layer, a graph specifying
 - Nodes
 - Edges
 - Faces



Face	Edge
<ul style="list-style-type: none">-Reference to 3 edges-Reference to 3 nodes-Up to two references for up to two face item	<ul style="list-style-type: none">-Two references for up to two faces of the edge-Capacity-Flow-Constrained-Linked list of items on the edge starting with one of the edge's nodes and ending with its other node

Figure 8

Figure 9



Node	
-Net Identifier	
-One or more planar-path references to adjacent topological items in the same planar path	
-A pair of via-path references to up and down topological via items	1000
-A references to list of edges connected to the node	
-For each edge, an edge reference to the next or previous topological item on the edge	
-A reference to the geometry of the node	
-Vertex number identifying the vertex of the geometry	
-Location of the node	

Figure 10

Face Item	
-Reference to its face	
-Net Identifier	
-Up to 3 planar-path references for adjacent topological items in the same planar path	1200
-A pair of via-path references for up and down topological via items	
-Bounding polygon that defines legal face item locations	
-Constraining Points and Distances	

Edge Item	
-Reference to its edge	
-Net Identifier	
-A pair of planar-path references to adjacent topological items in the same planar path	1100
-A pair of edge references to the next and previous topological item on the edge	

Figure 11

Figure 12

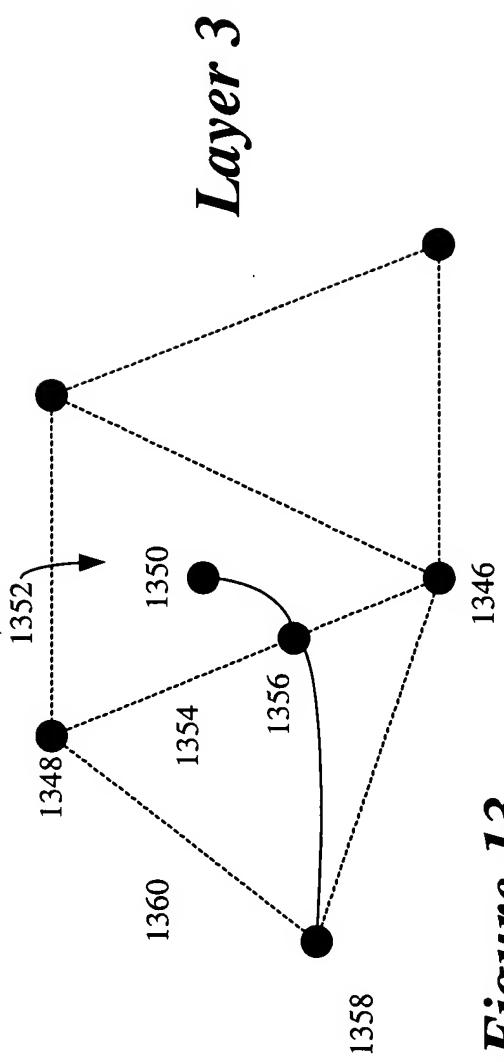
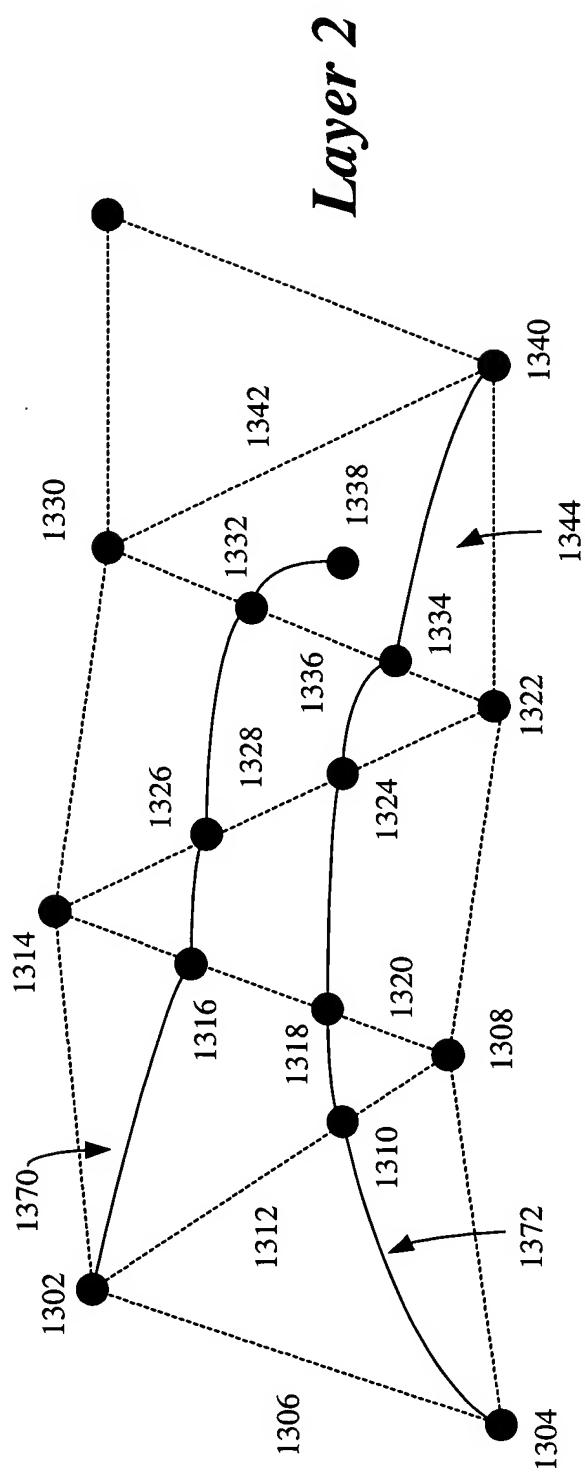


Figure 13

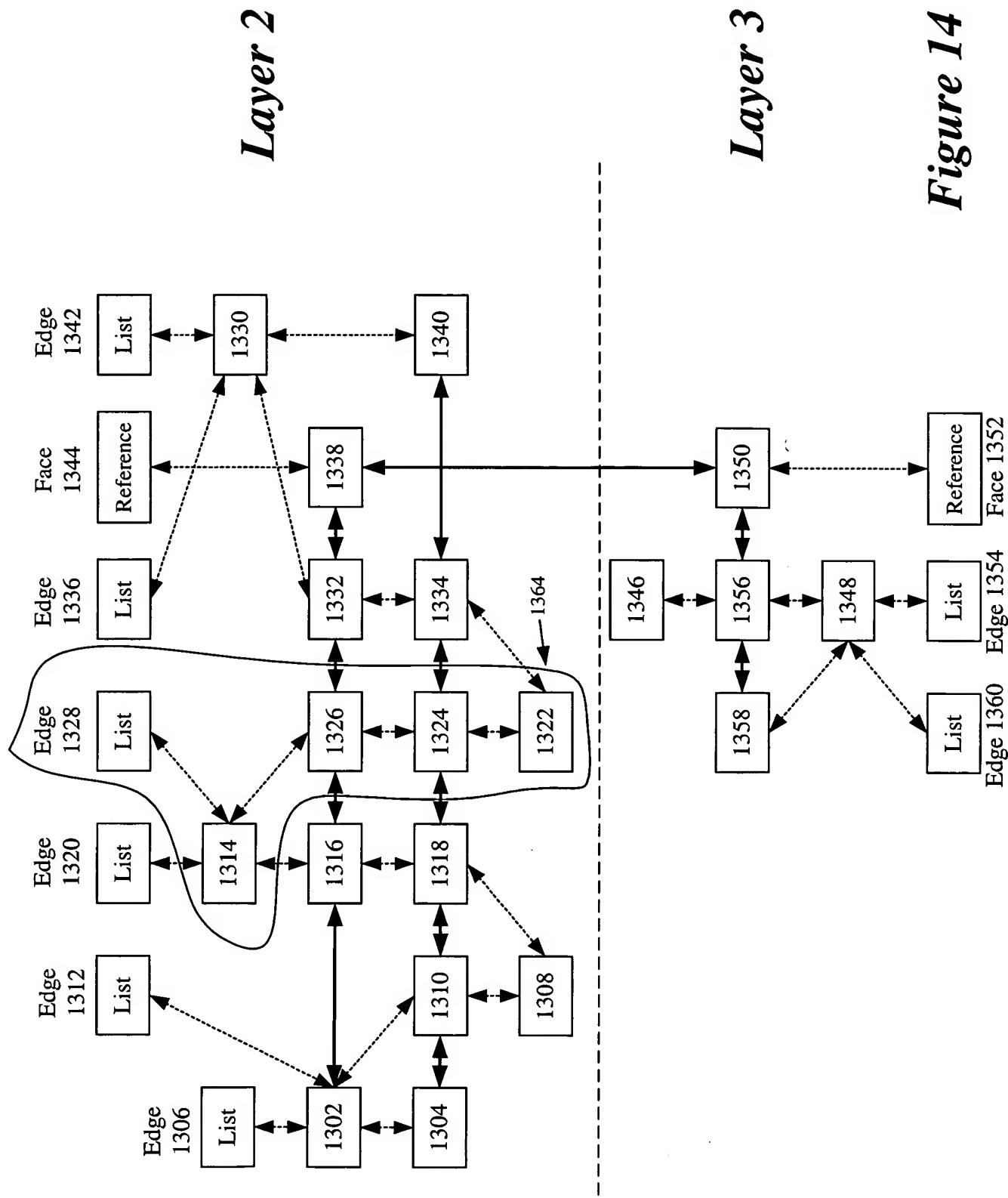


Figure 14

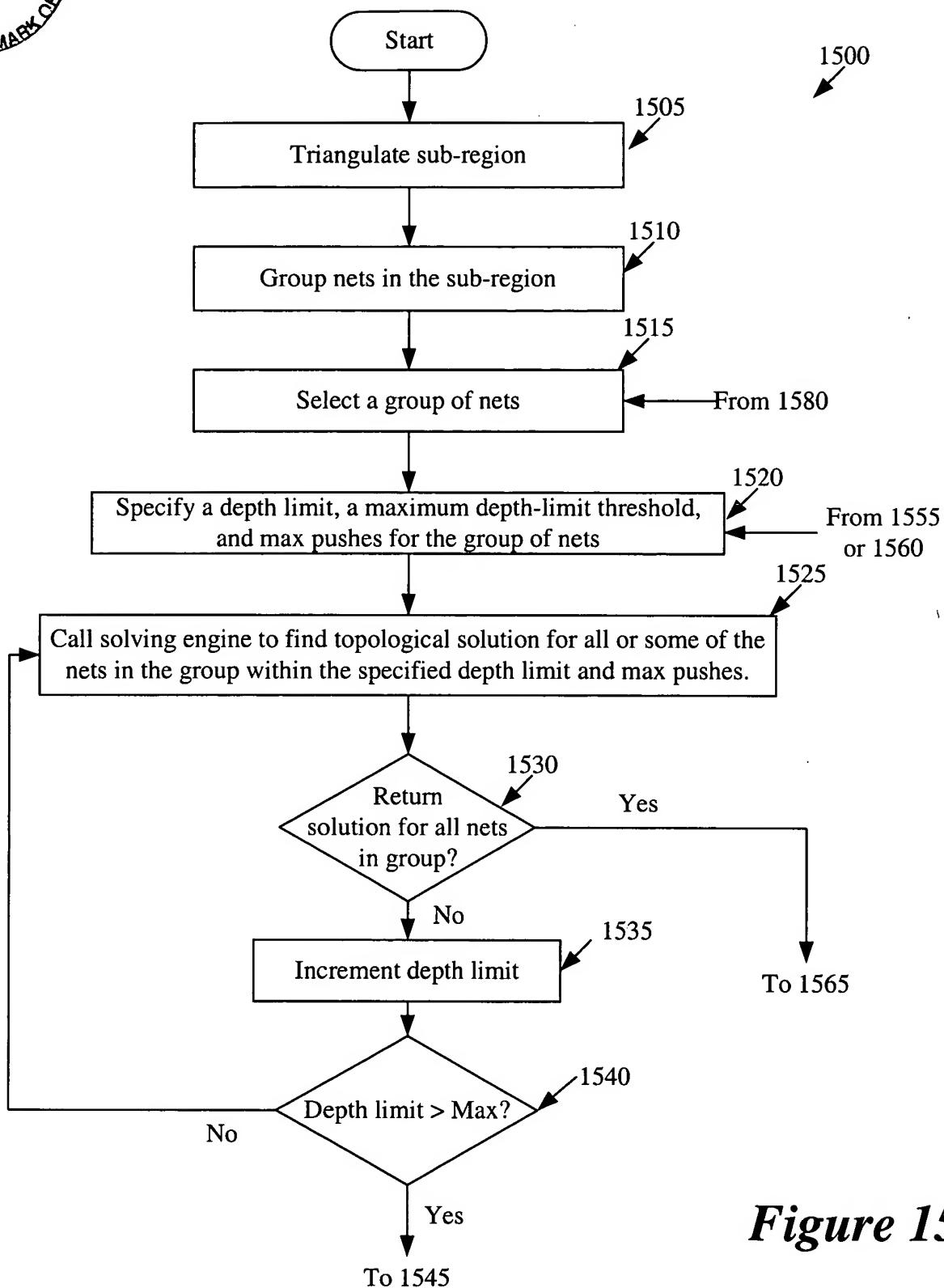


Figure 15A

Figure 15: **Figure 15A**
Figure 15B

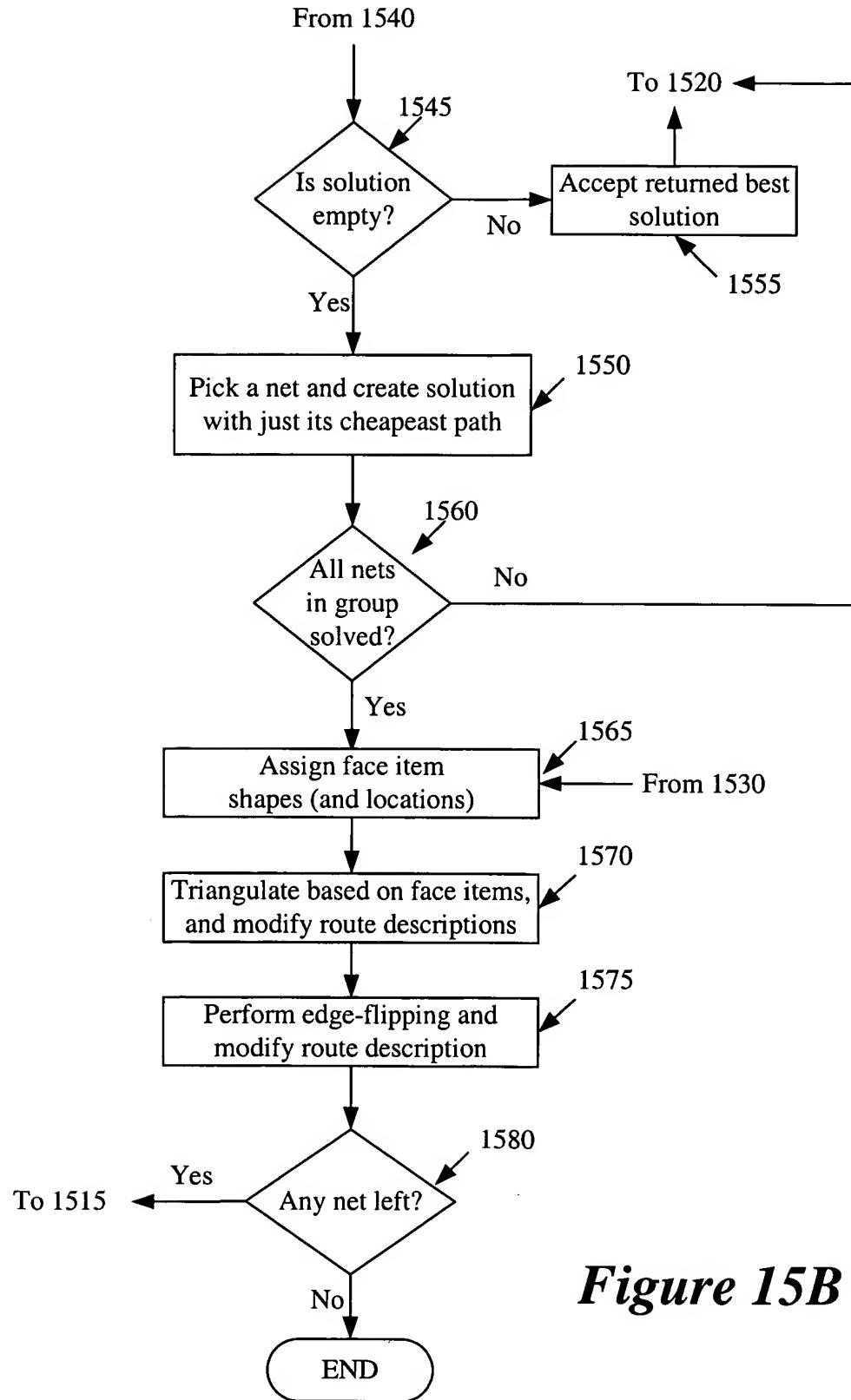


Figure 15B

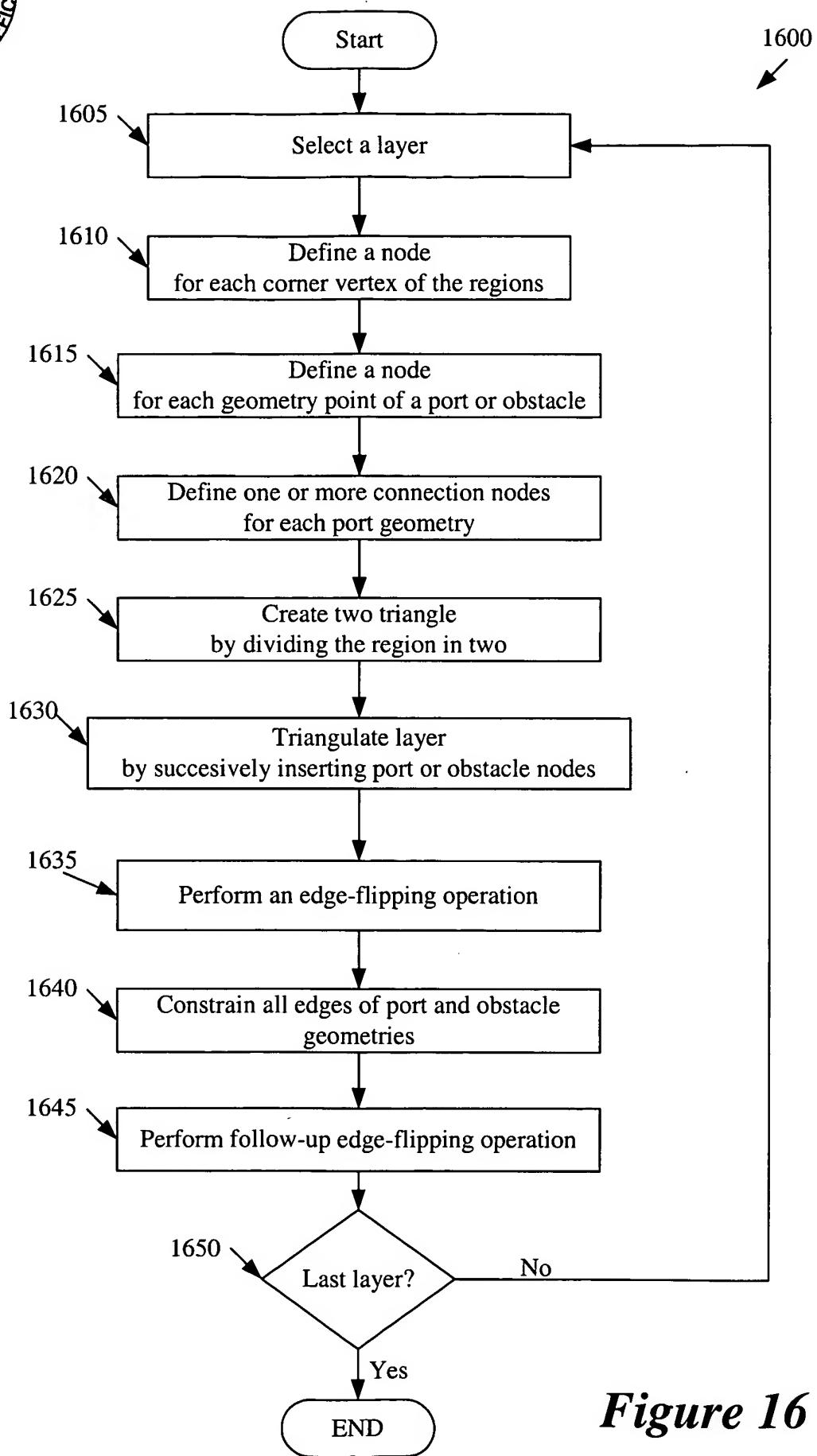


Figure 16

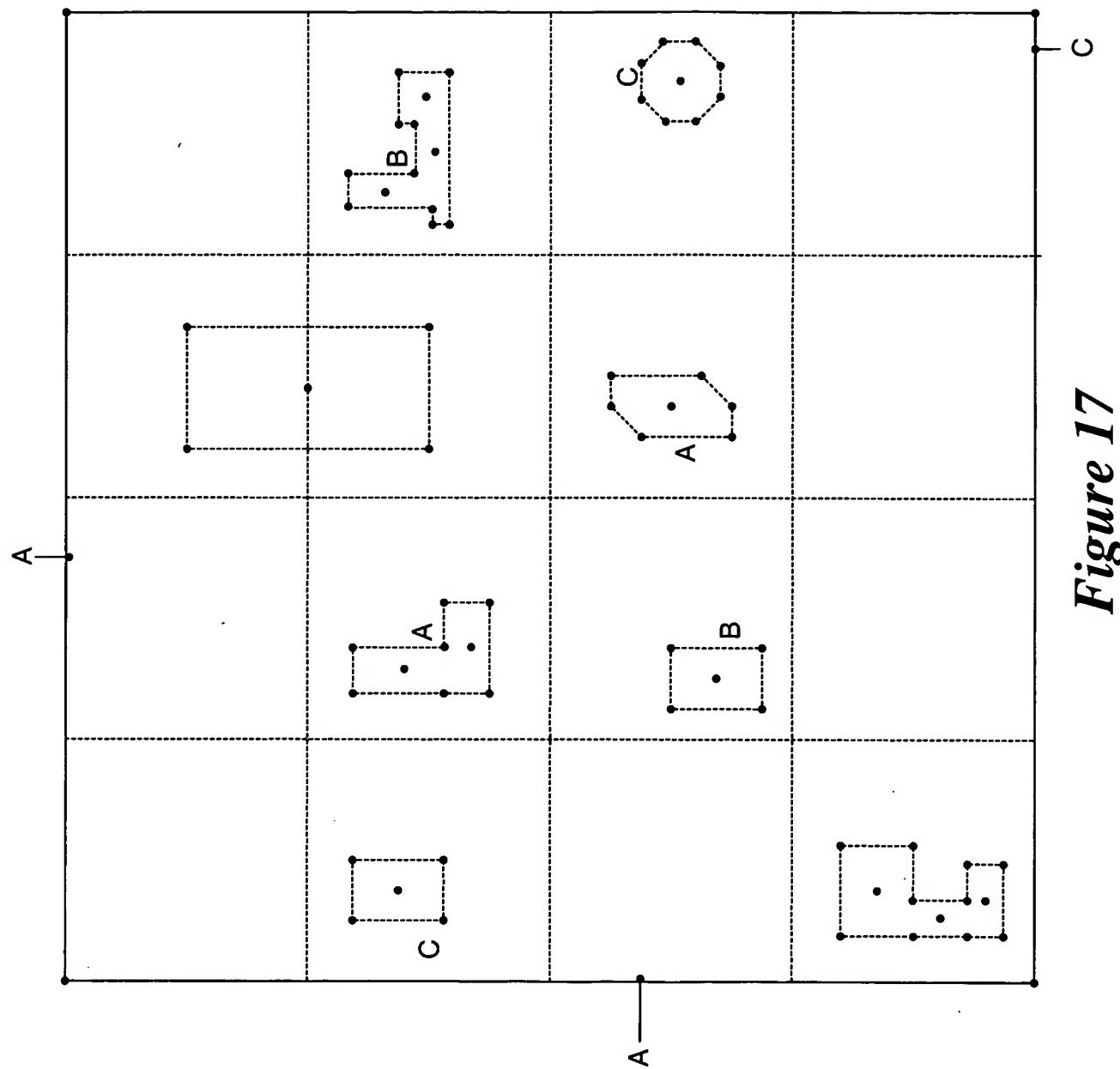


Figure 17

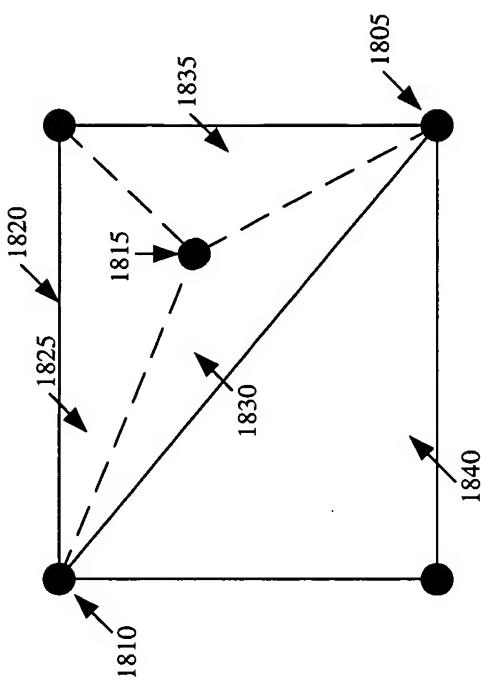


Figure 18

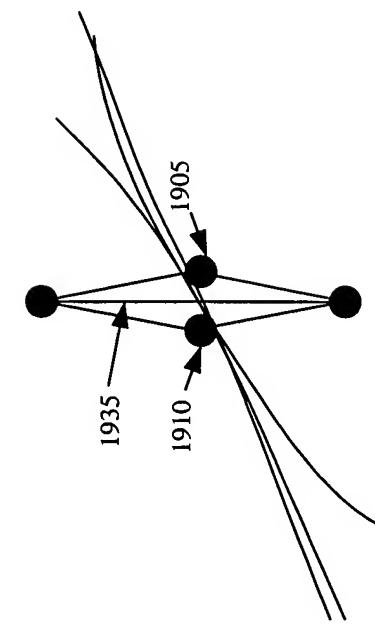


Figure 19

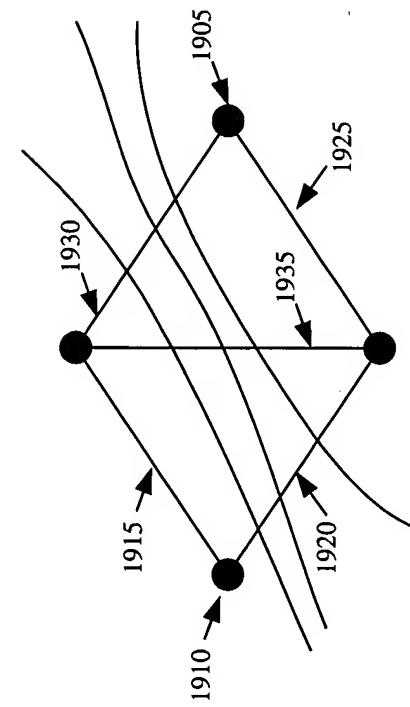


Figure 20



Figure 21

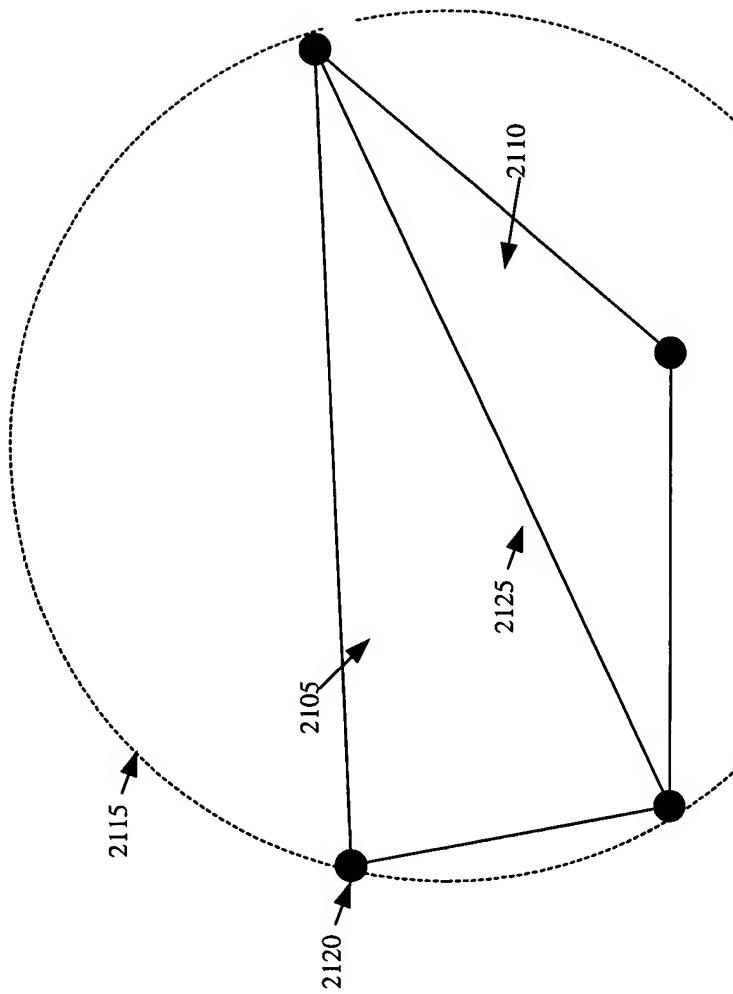
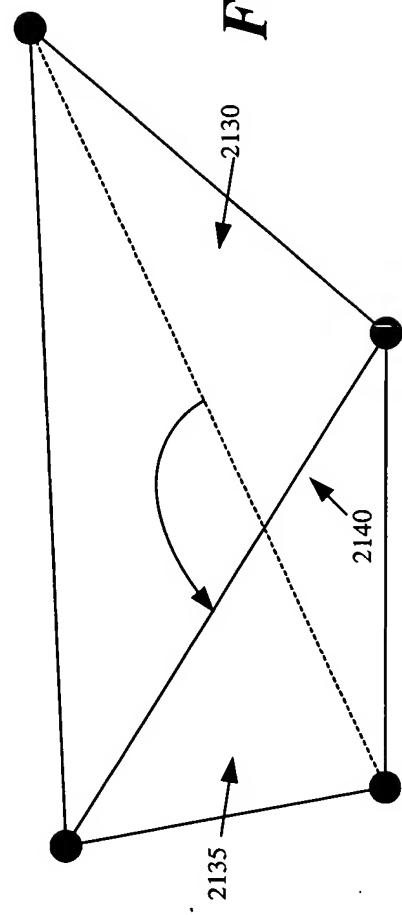


Figure 22



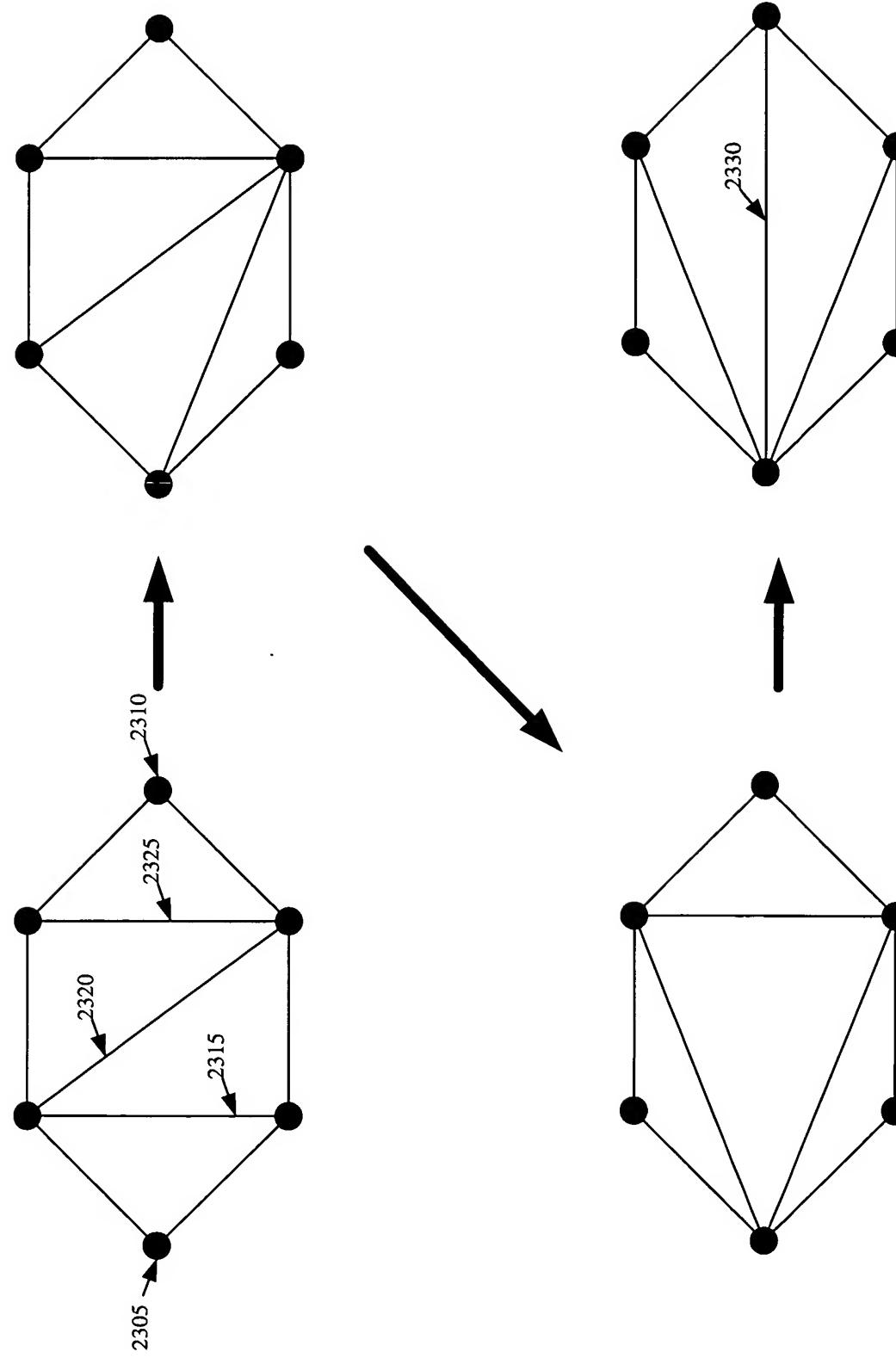


Figure 2.3

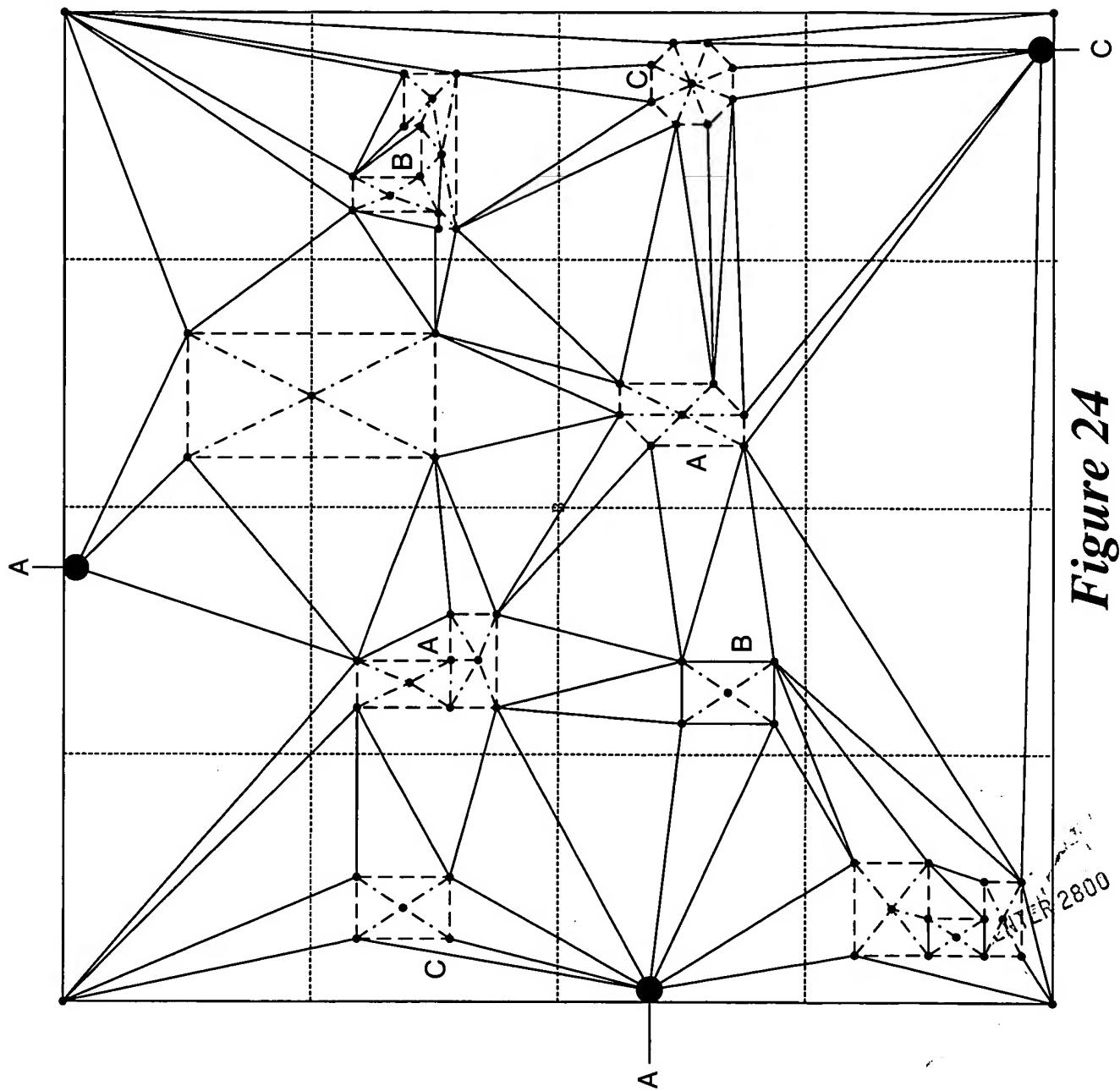


Figure 24

ENTER 2800

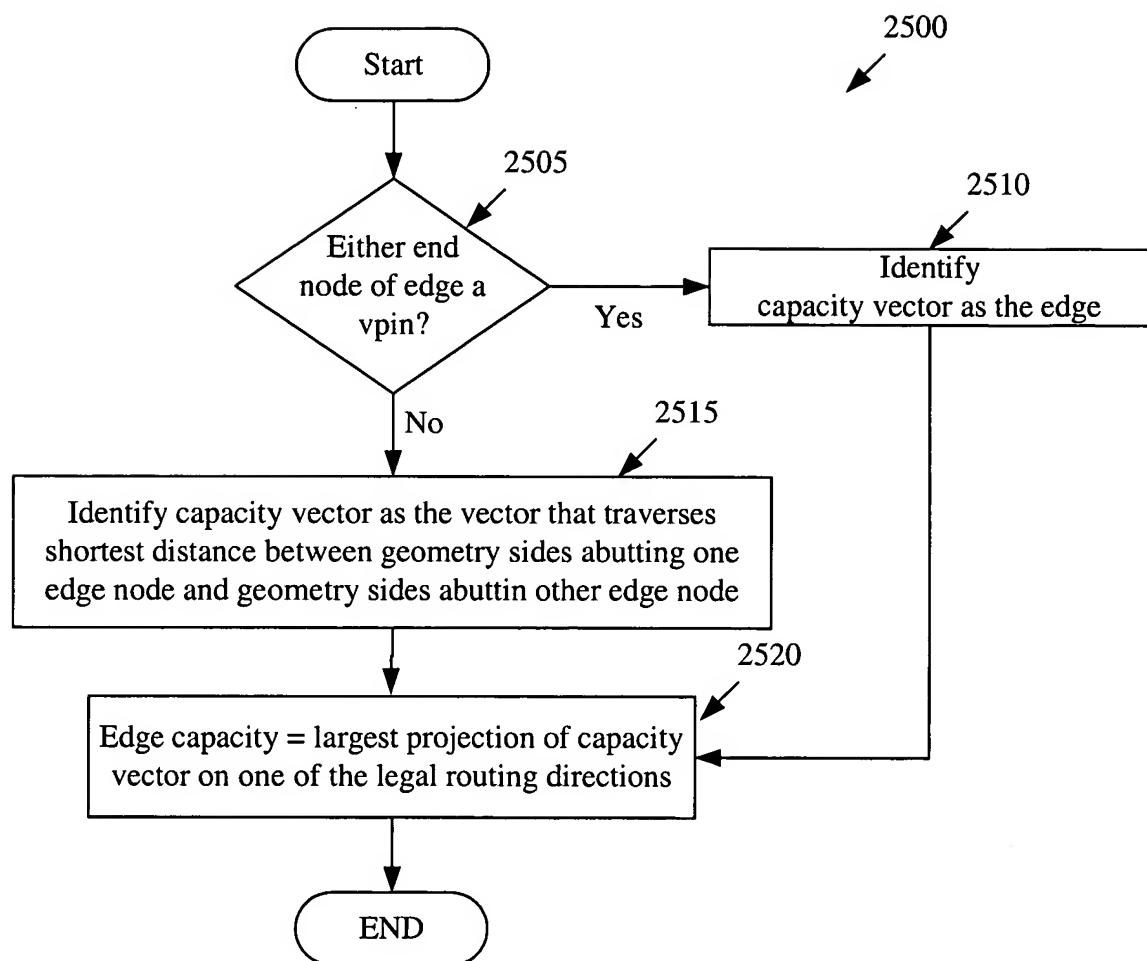


Figure 25

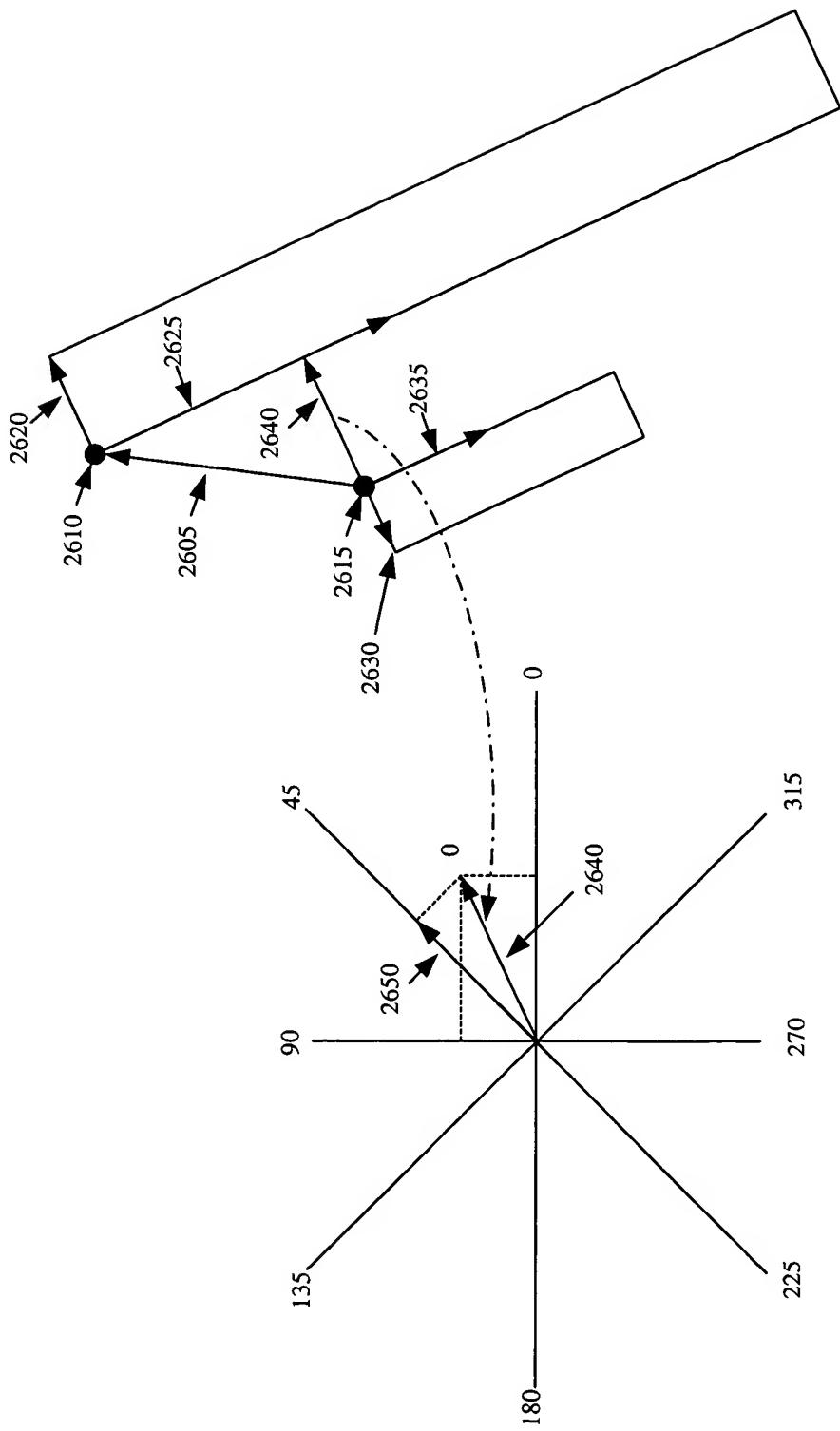


Figure 26

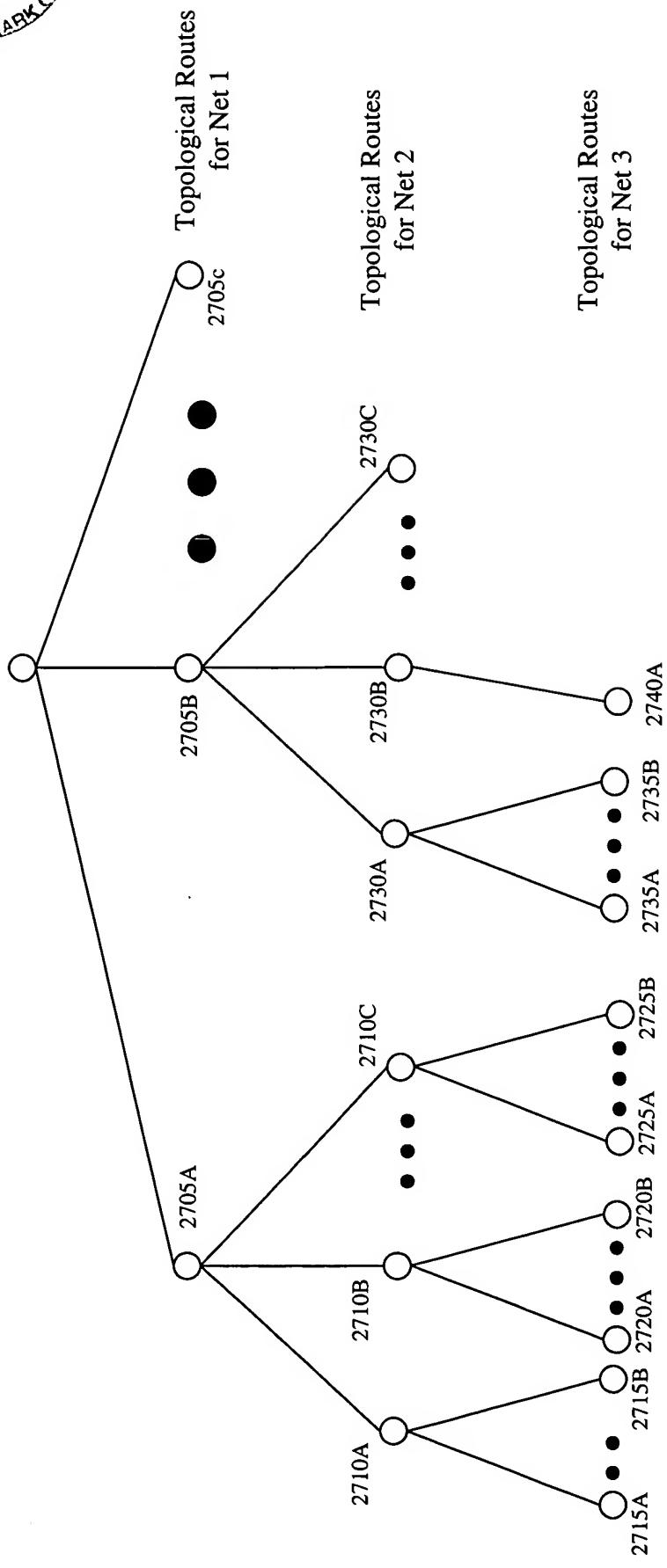


Figure 27

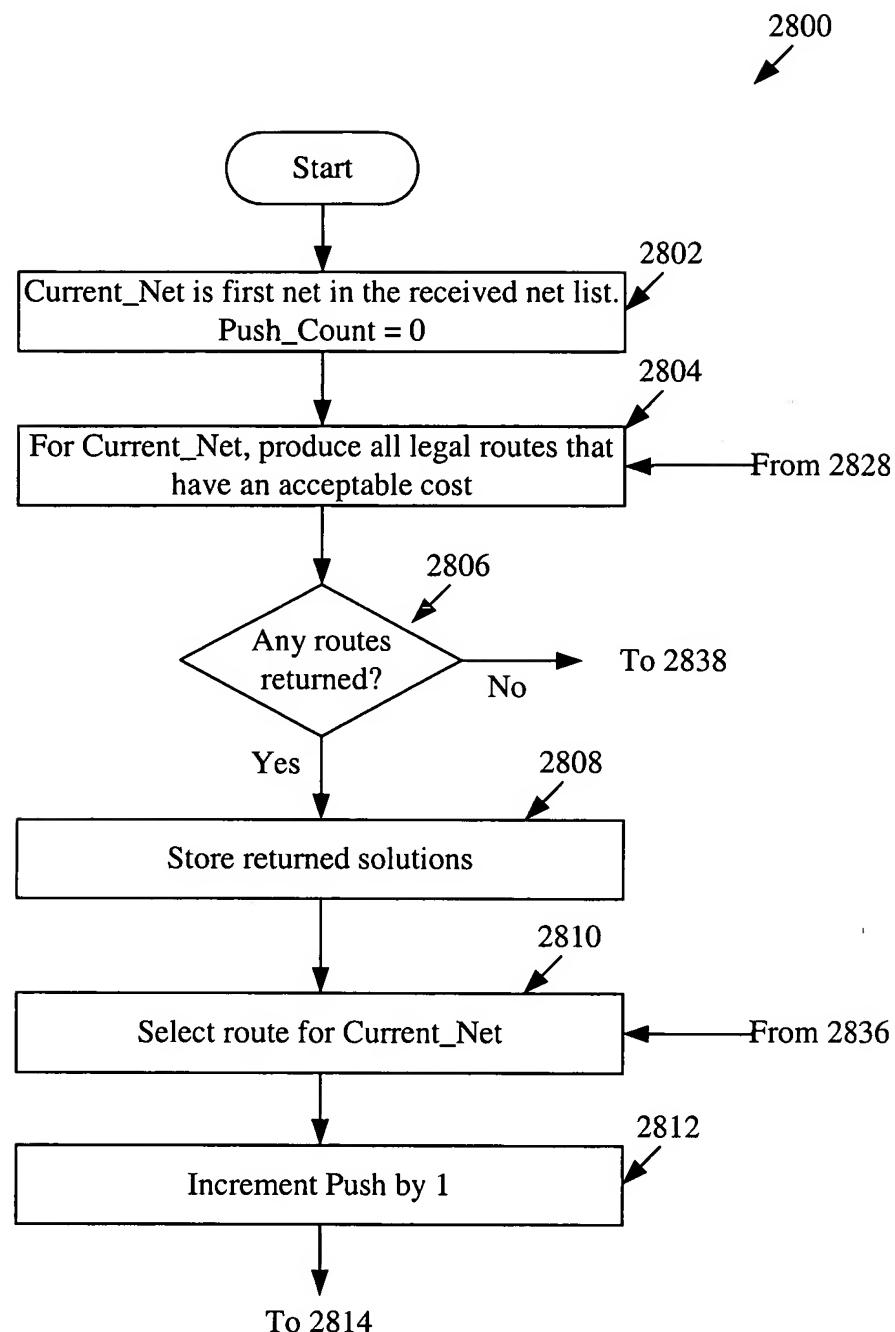


Figure 28A

Figure 28: *Figure 28A*
Figure 28B
Figure 28C

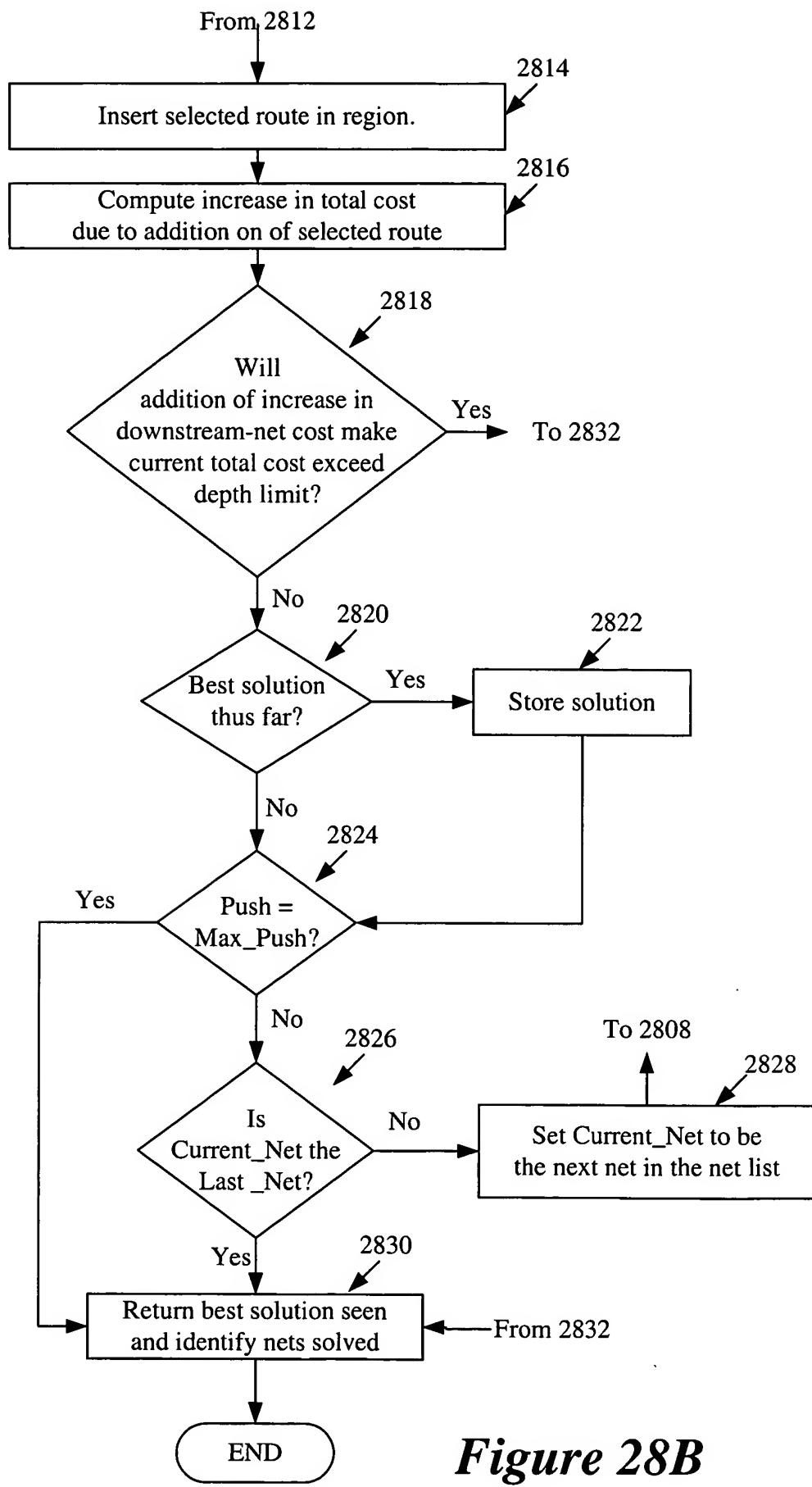


Figure 28B

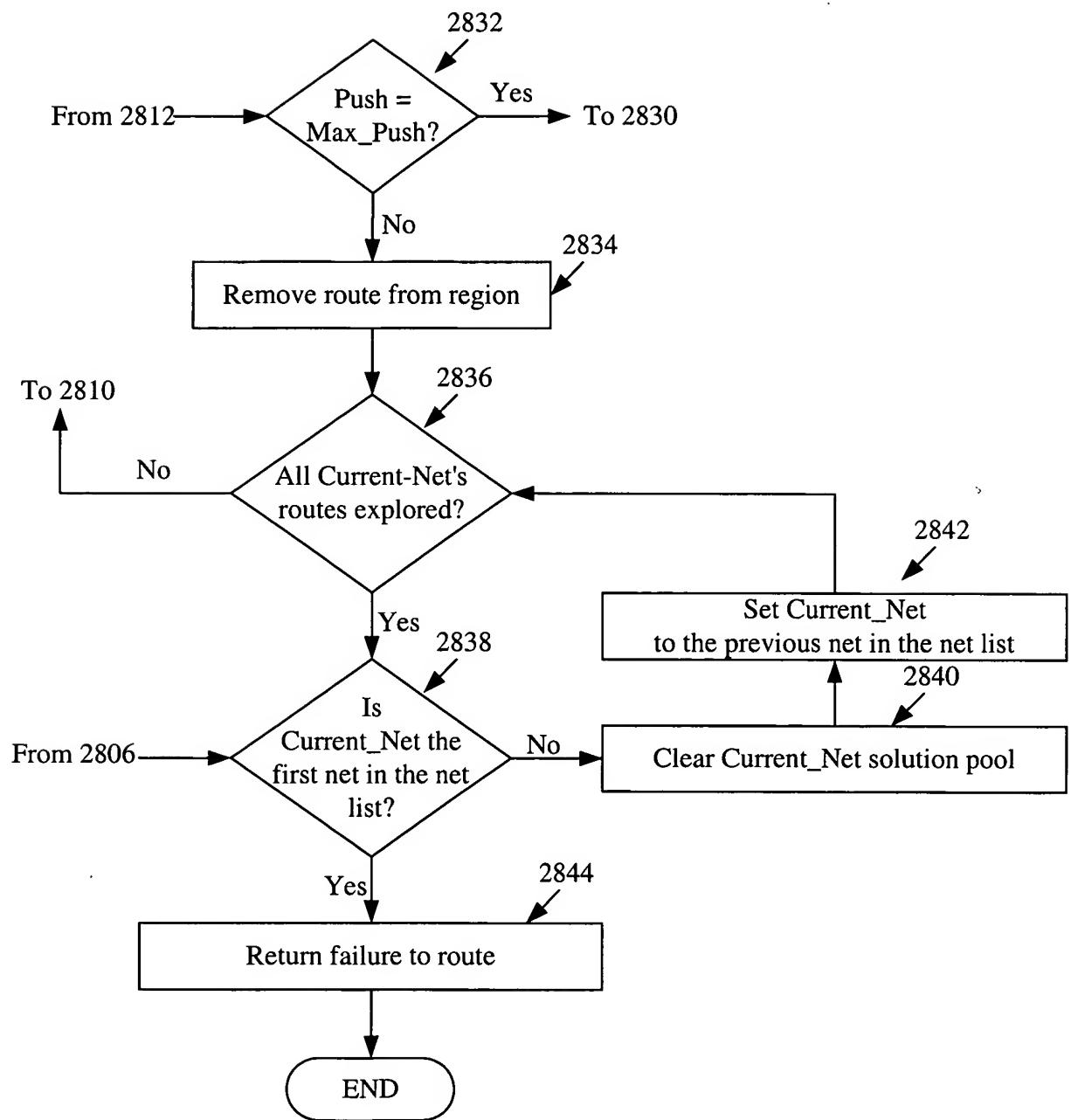


Figure 28C

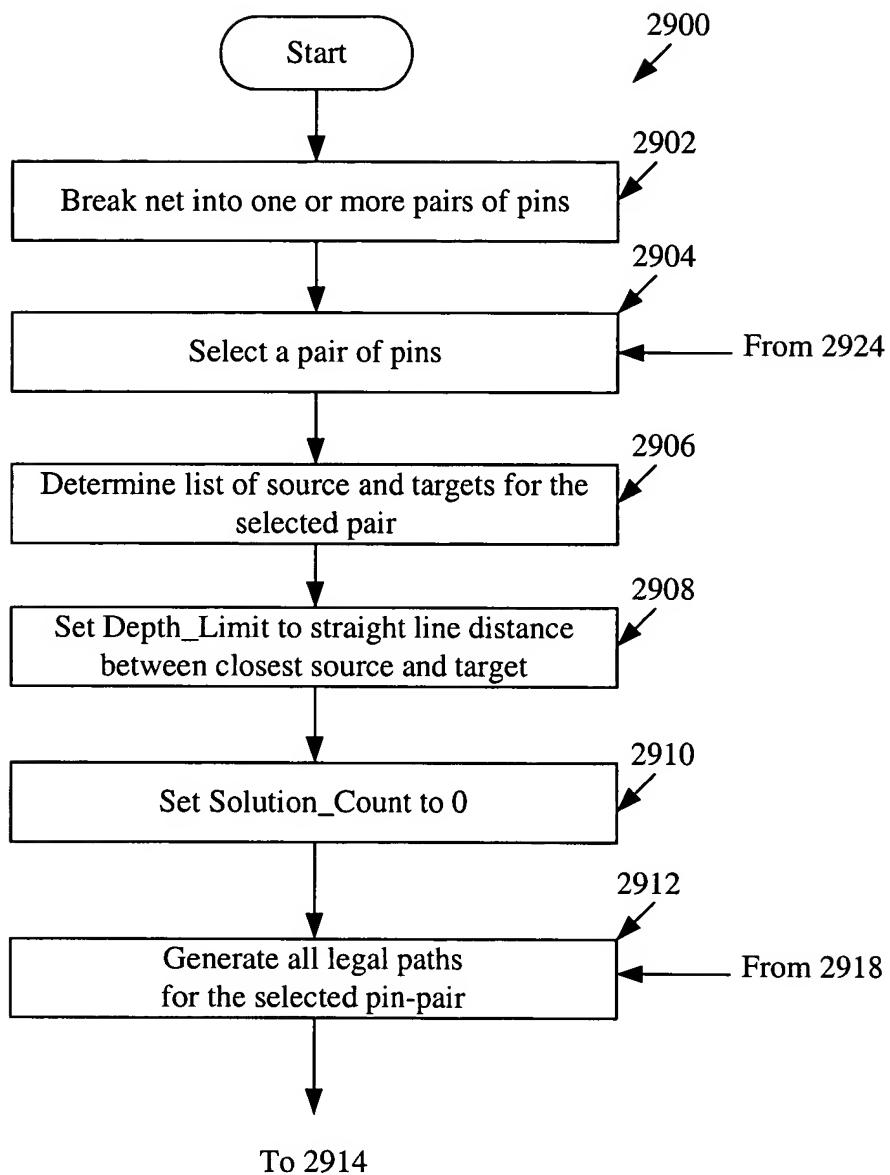


Figure 29A

Figure 29: $\frac{\text{Figure 29A}}{\text{Figure 29B}}$

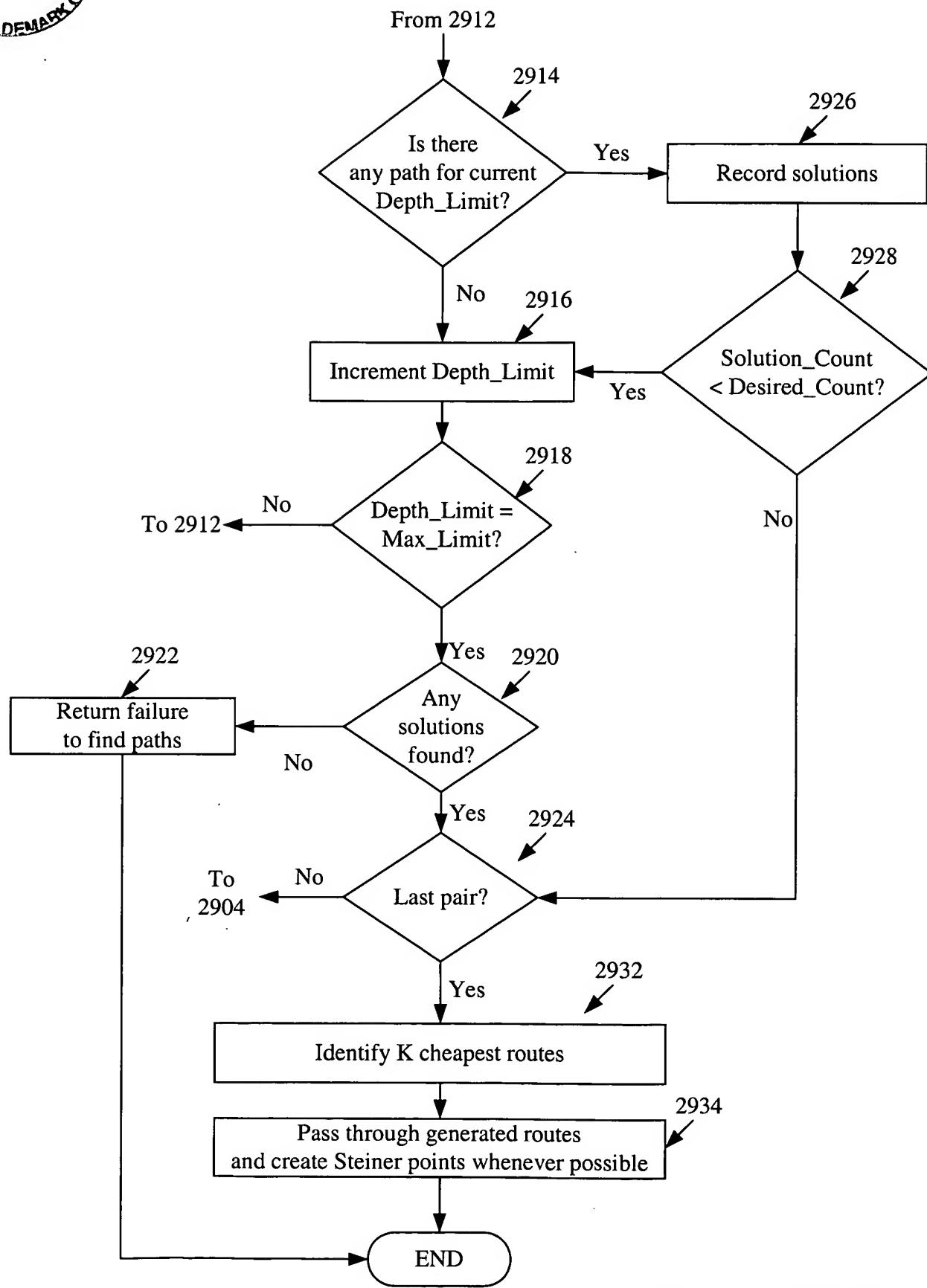


Figure 29B

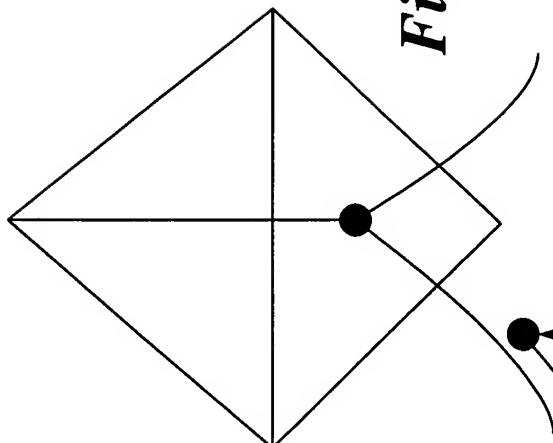


Figure 30B

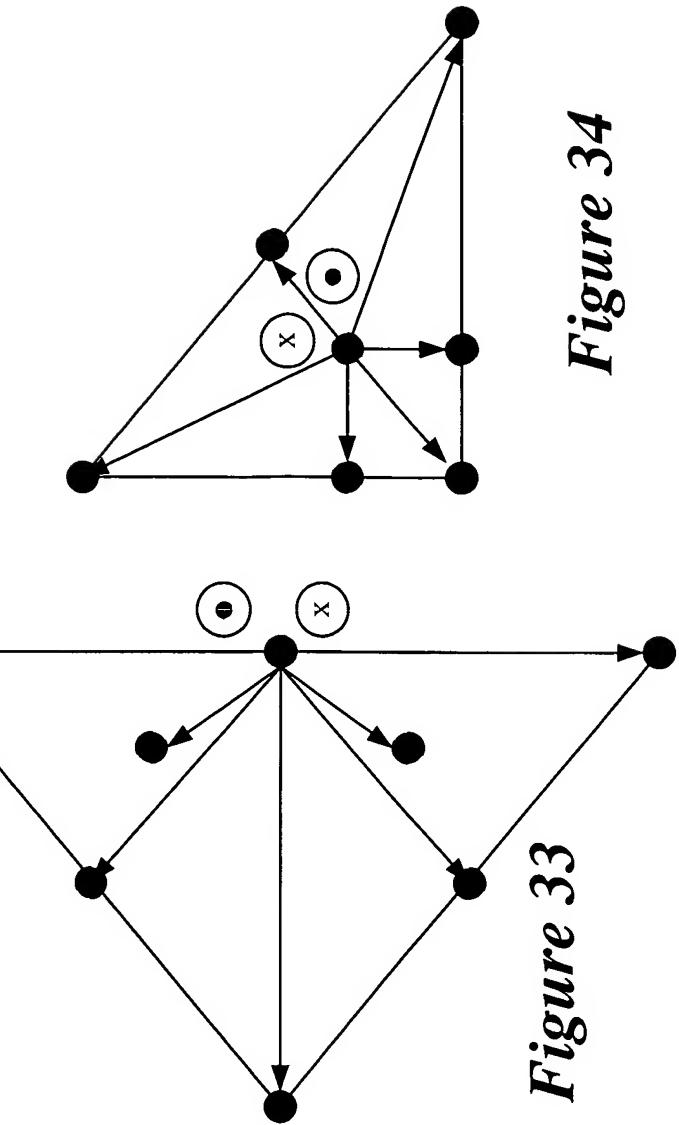


Figure 34

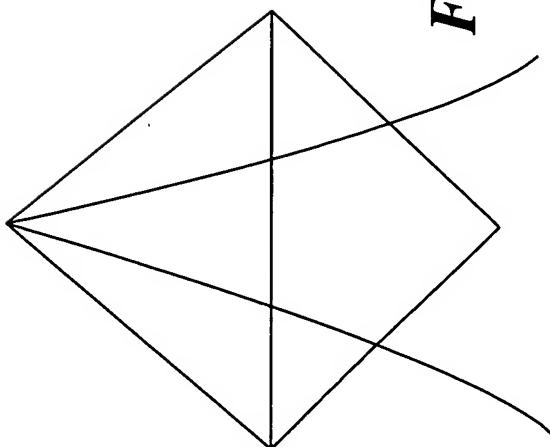


Figure 30A

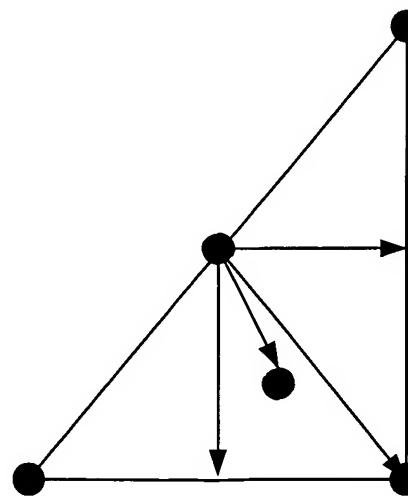


Figure 32

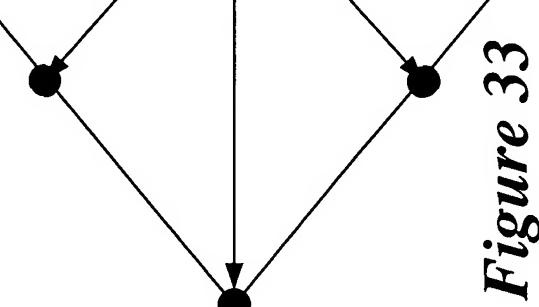


Figure 33

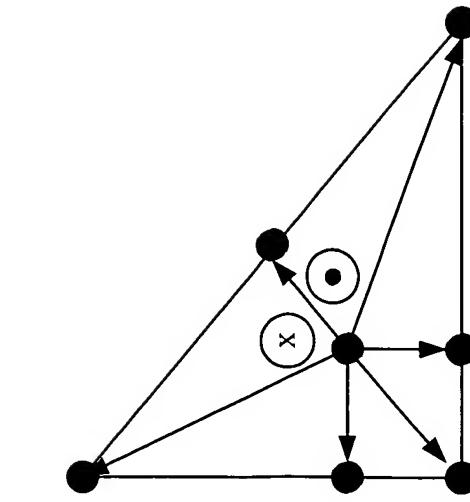


Figure 34

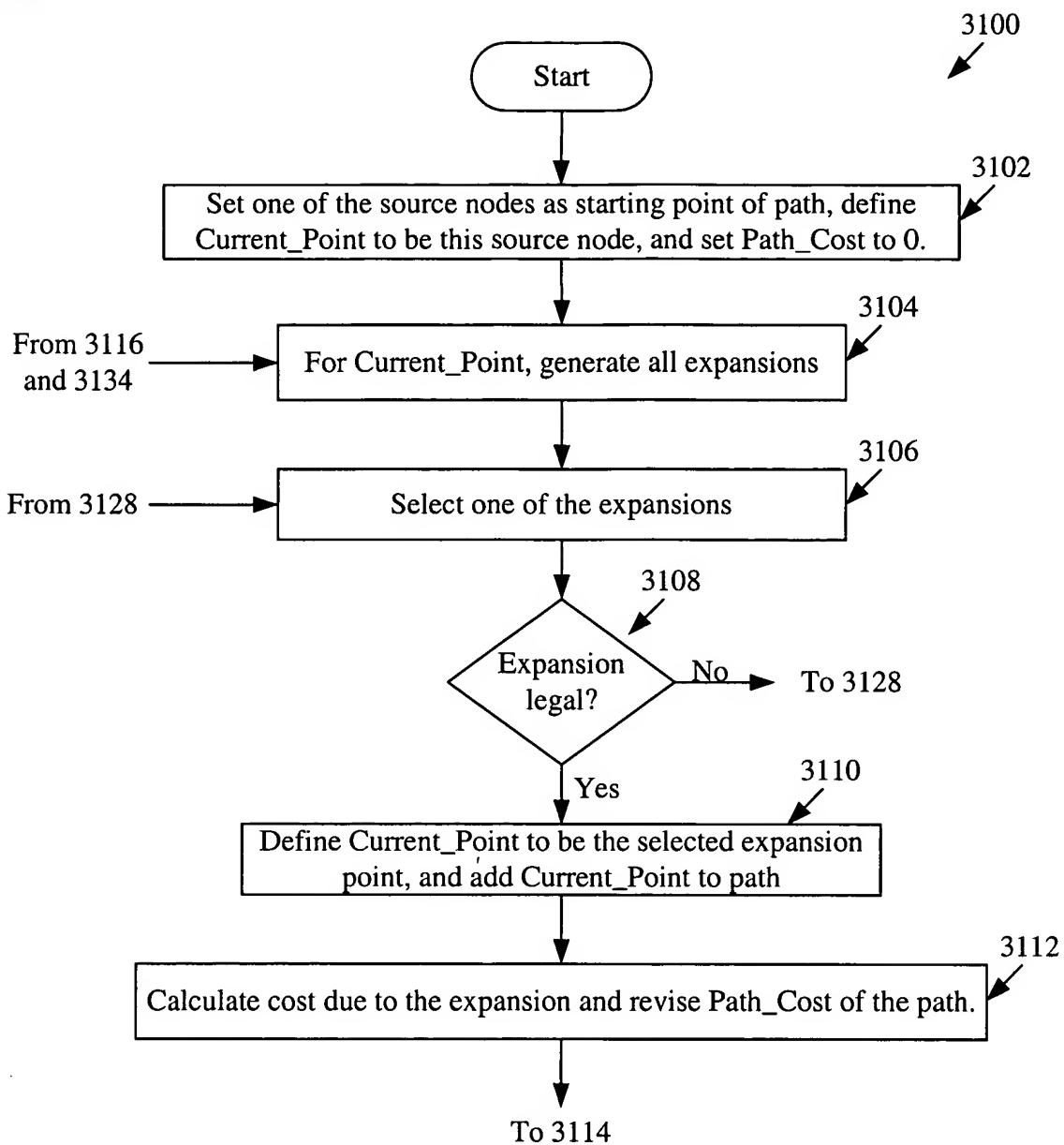


Figure 31A

*Figure 31: Figure 31A
Figure 31B*

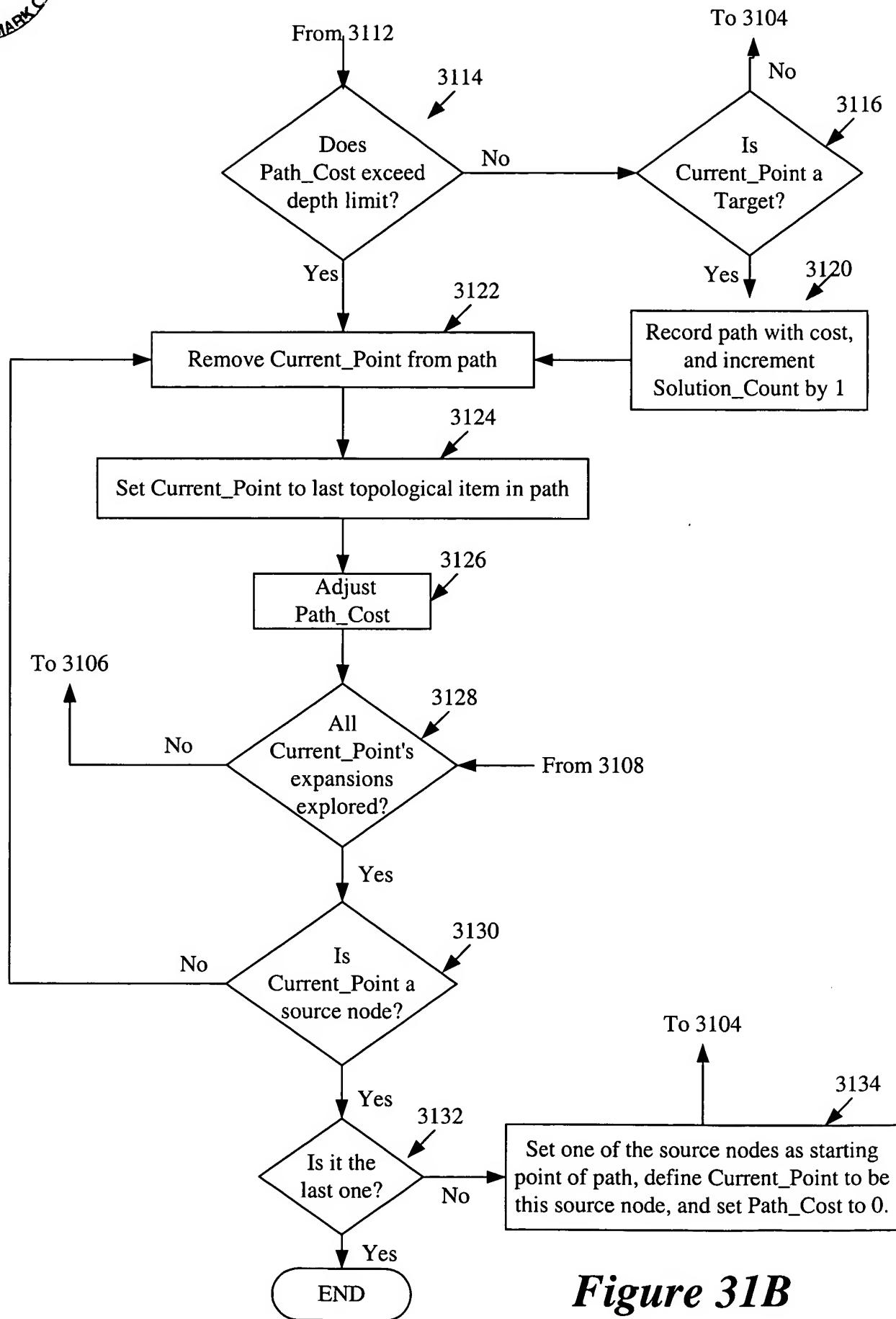


Figure 31B



Figure 38A

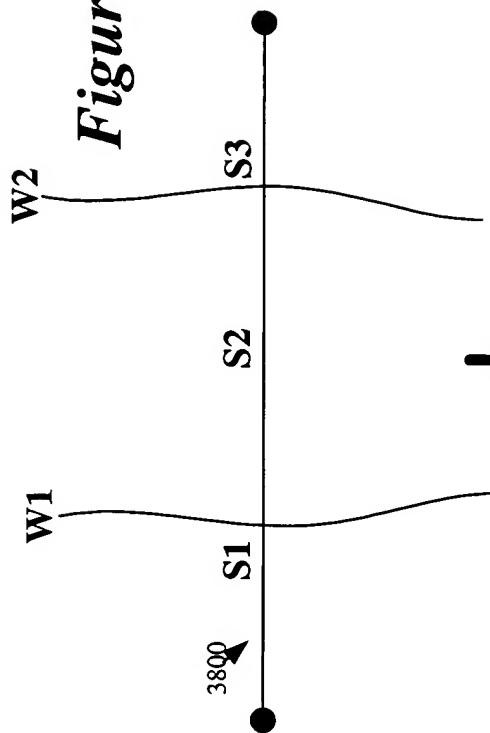


Figure 38B

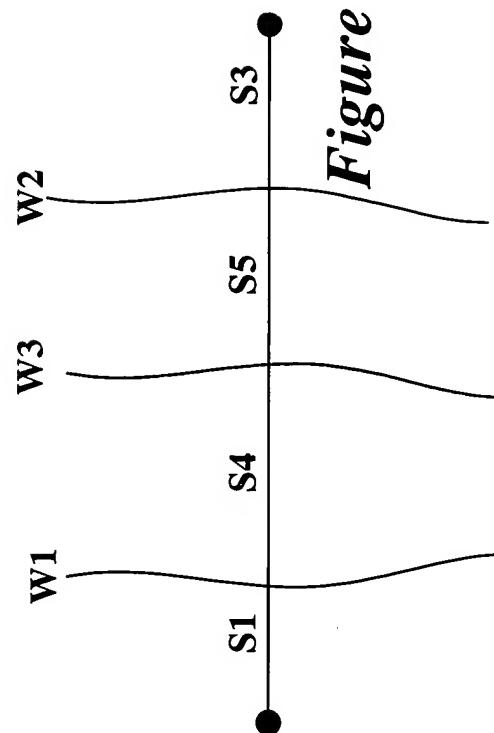


Figure 35

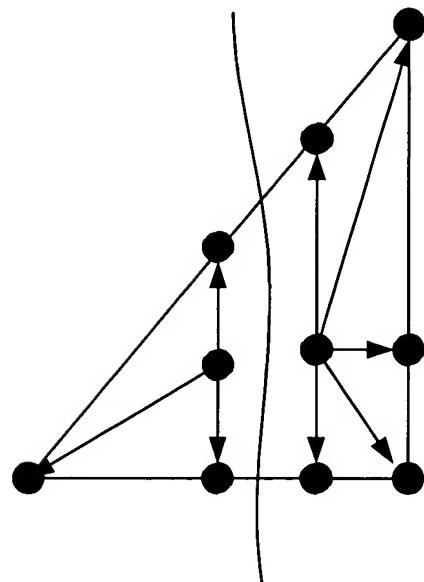
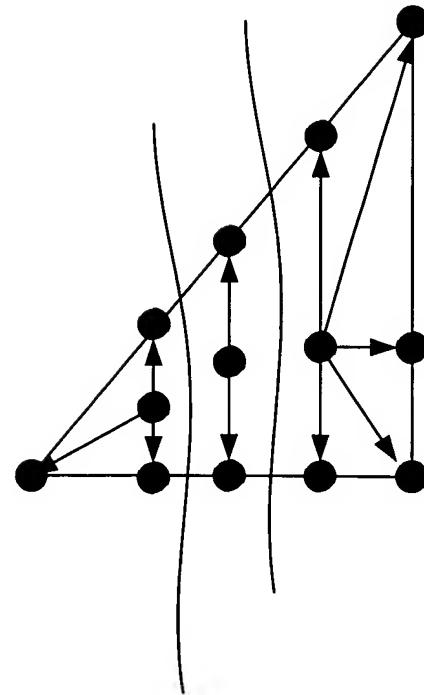


Figure 36





From:	To:	Node	Face Item	Edge Item
Node				
Face Item				
Edge Item				

Node

- Planarity
- Vias

Face Item

- Vias

Edge Item

- Planarity
- Vias

- Planarity
- Vias
- Edge Capacity

- Planarity
- Vias
- Edge Capacity

Figure 37

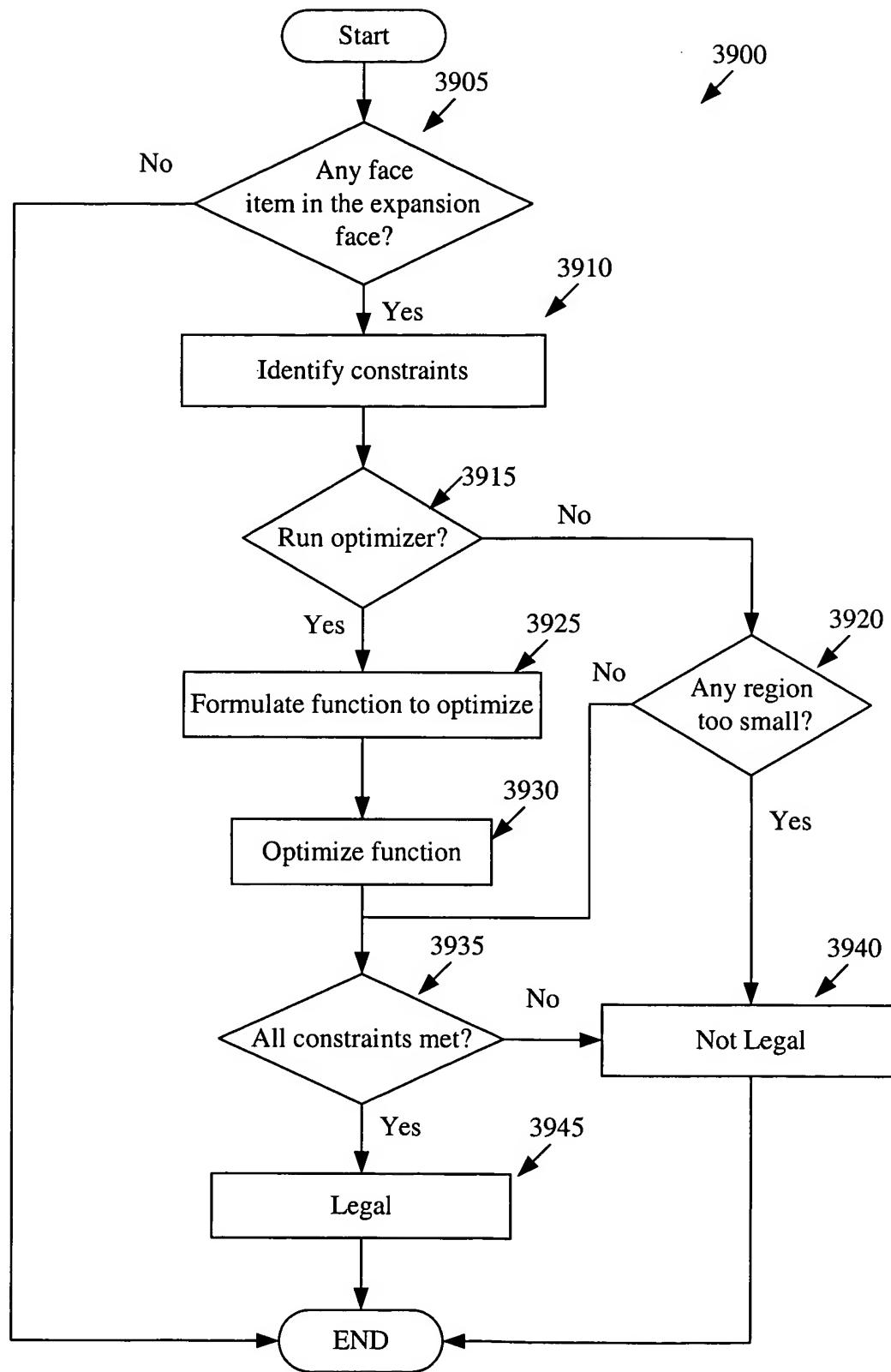


Figure 39A

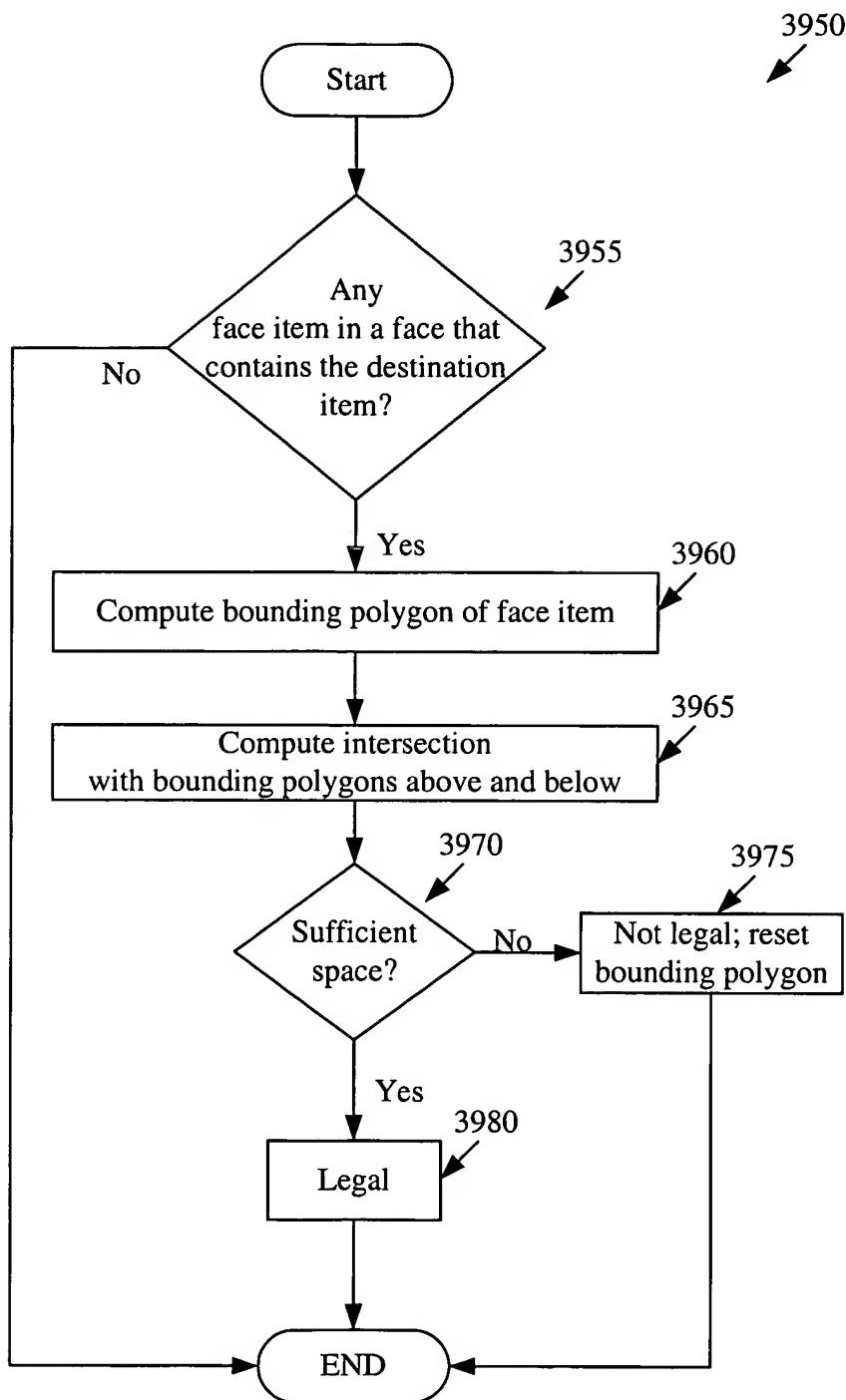


Figure 39B

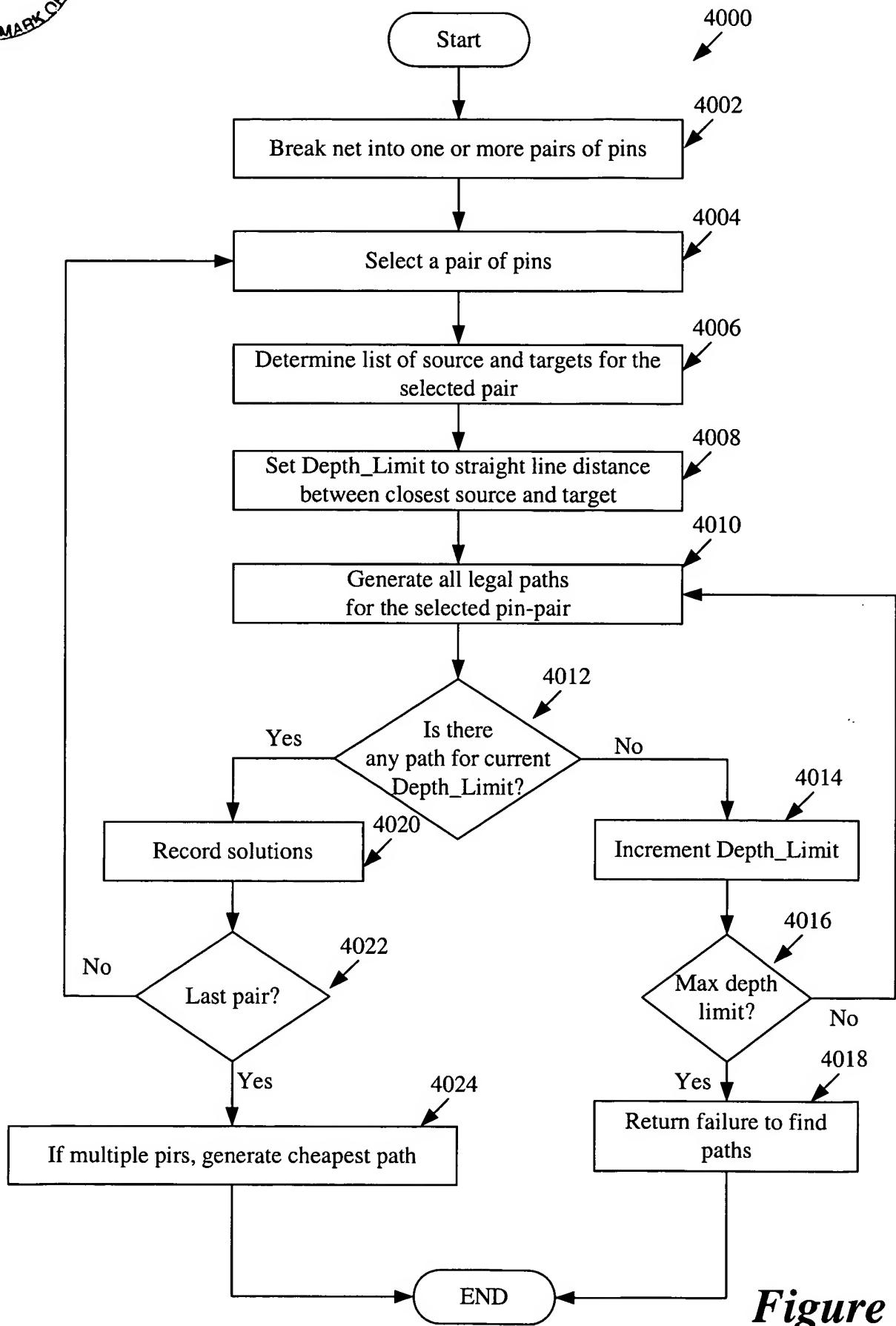


Figure 40

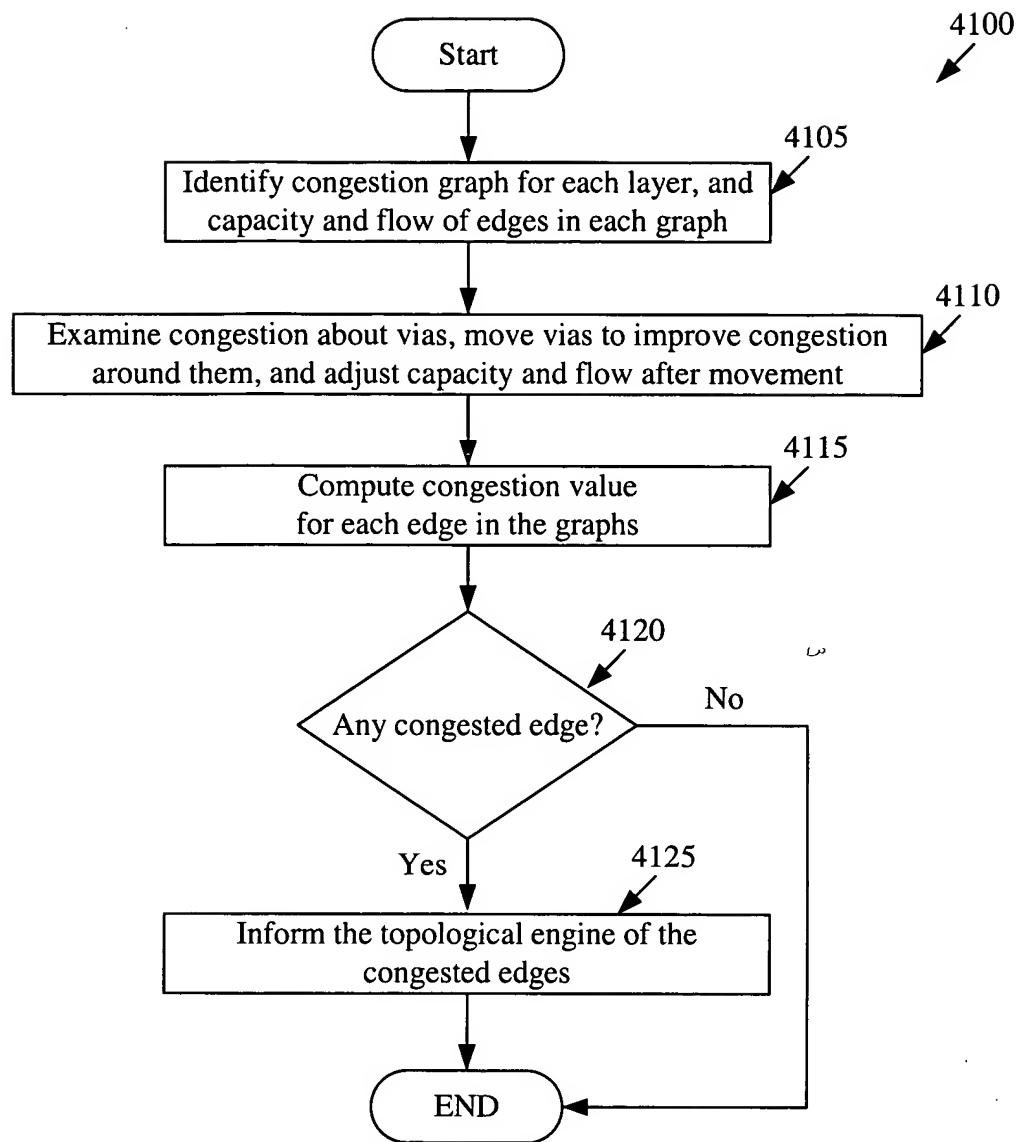


Figure 41

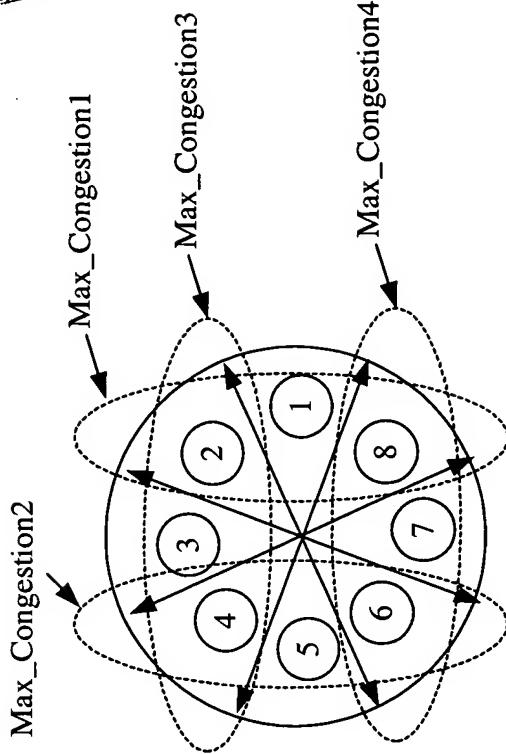


Figure 44

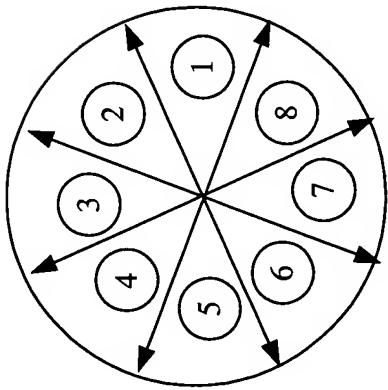


Figure 42

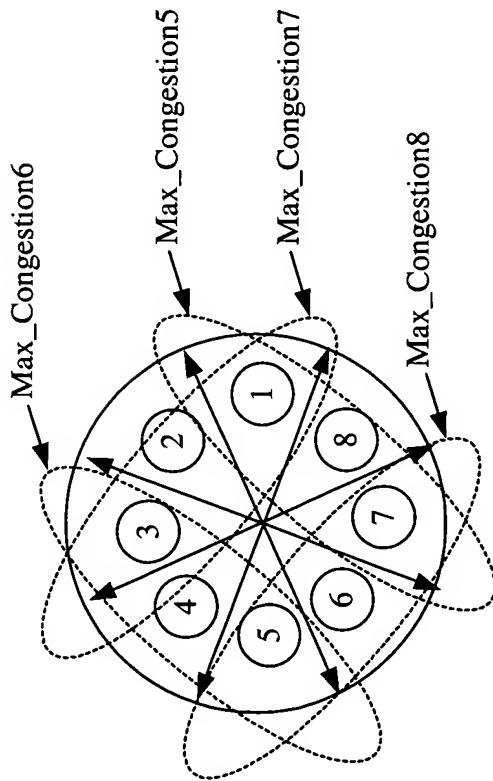


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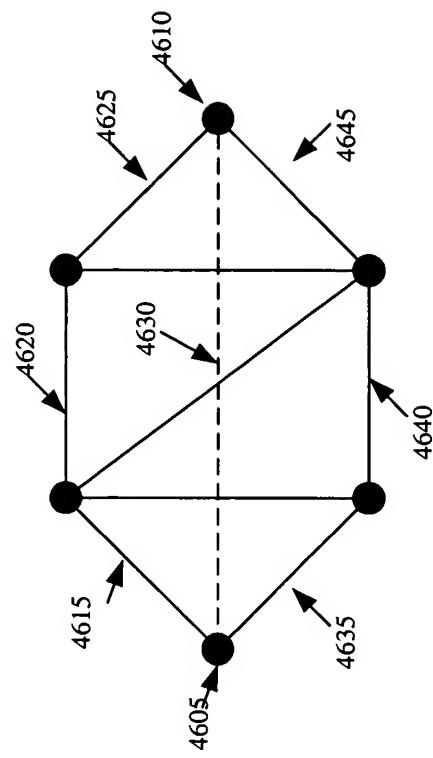


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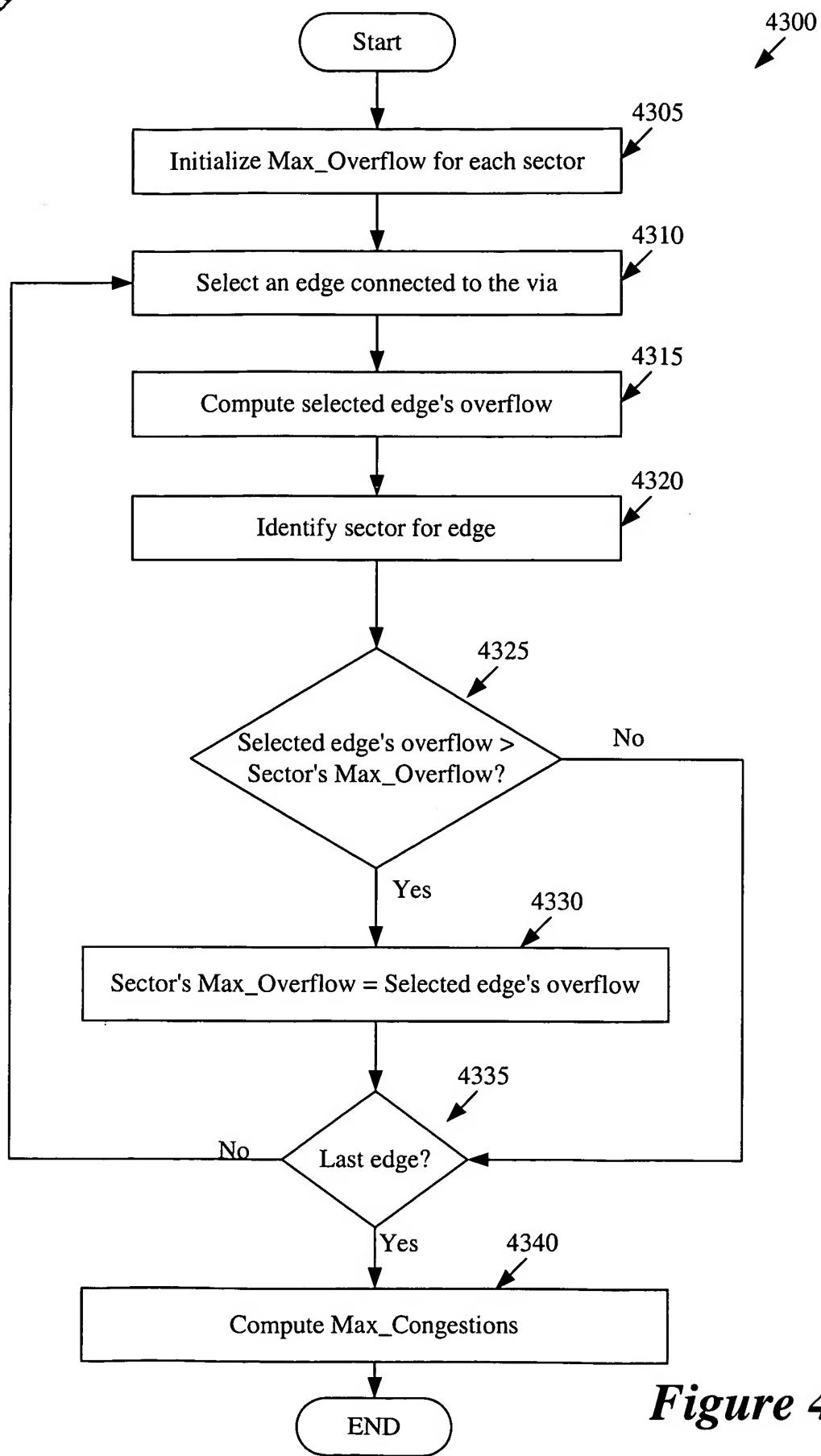


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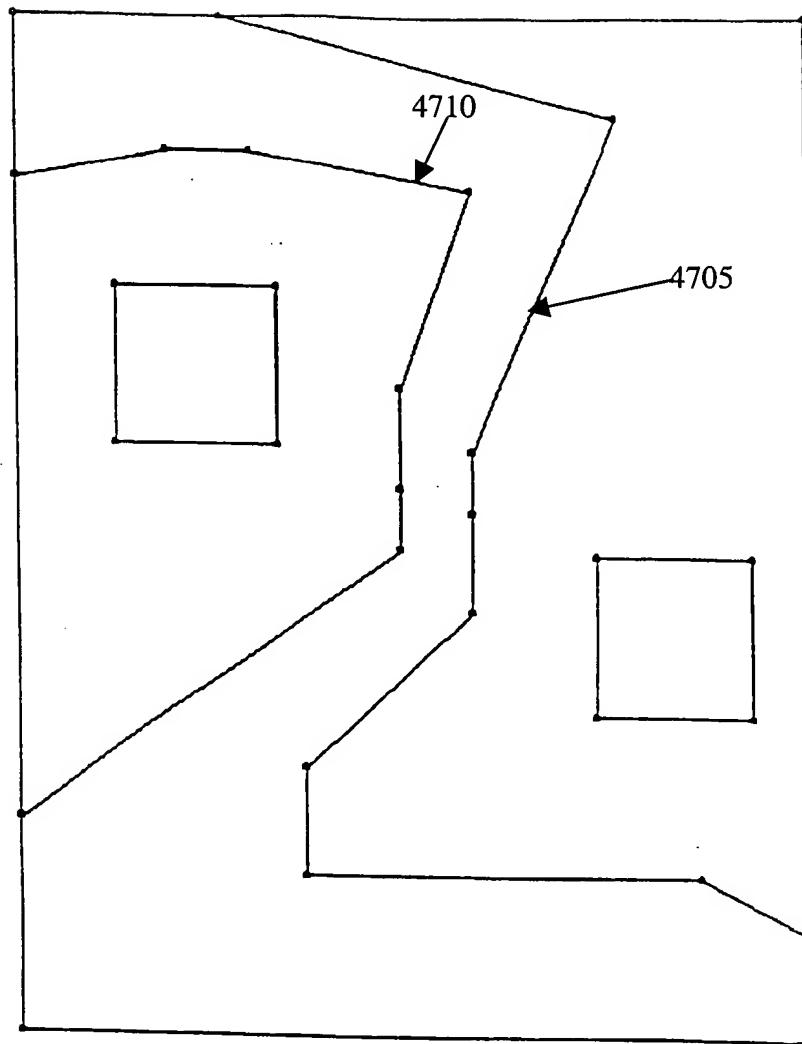


Figure 47

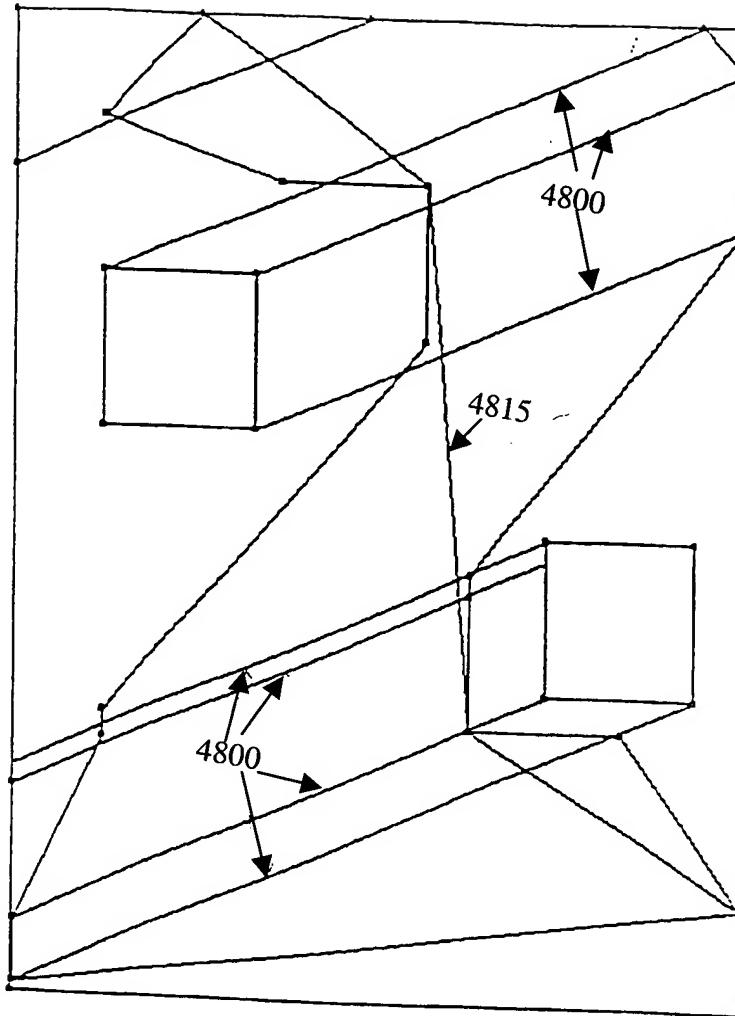


Figure 48A

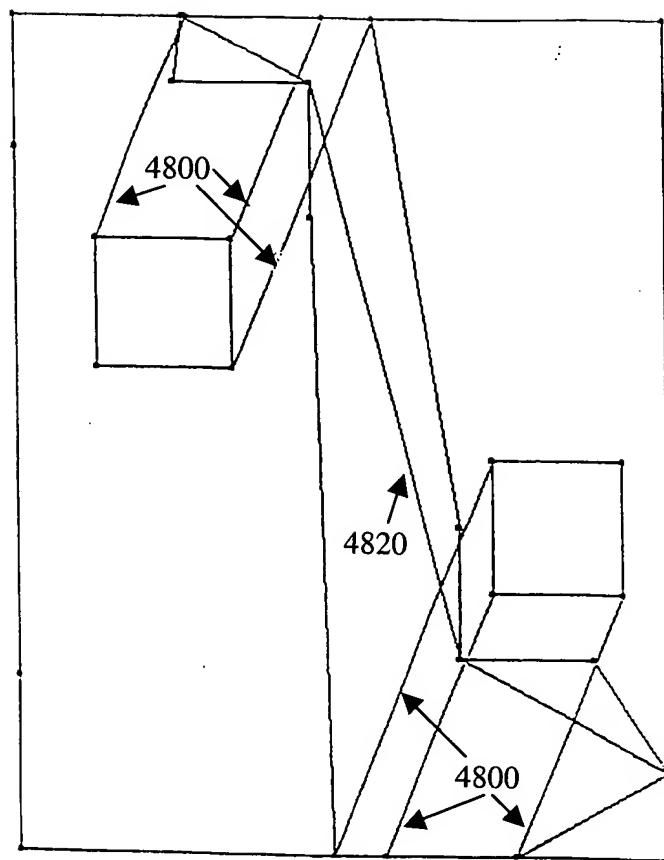


Figure 48B

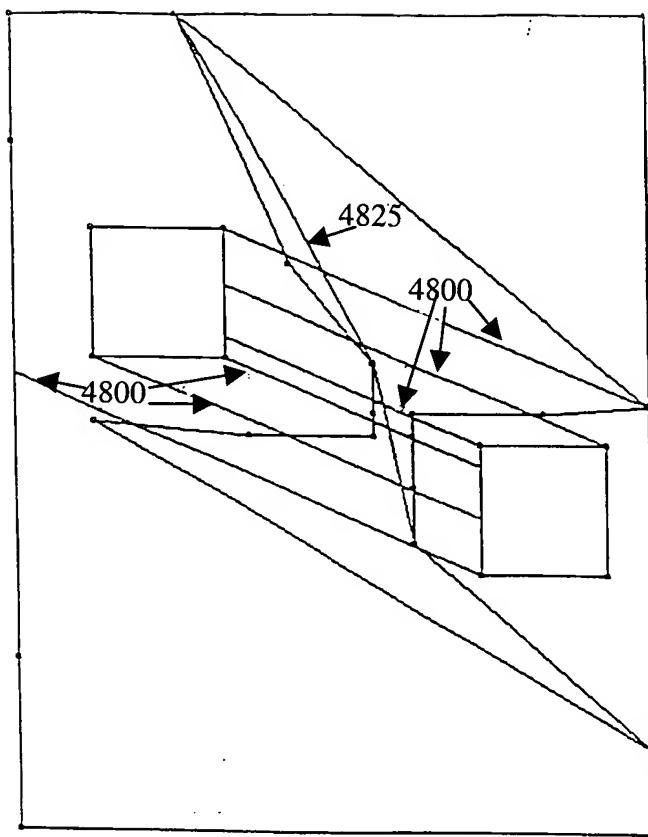


Figure 48C

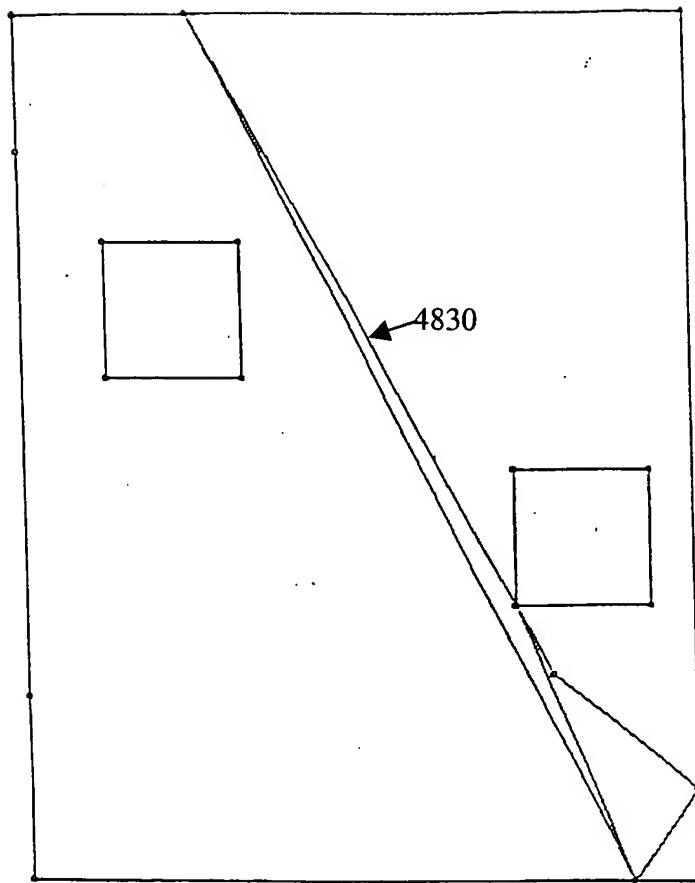


Figure 48D

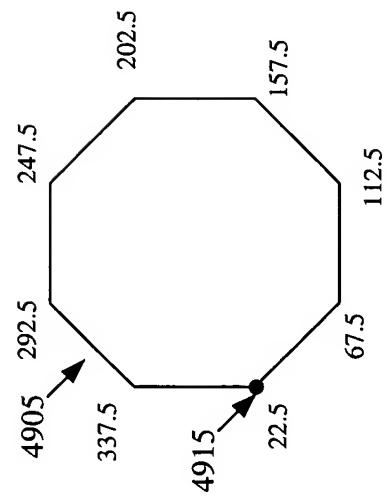


Figure 49A

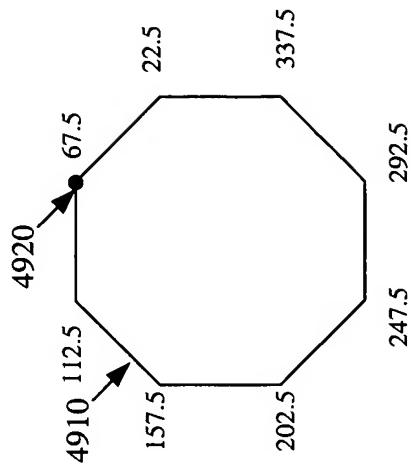


Figure 49B

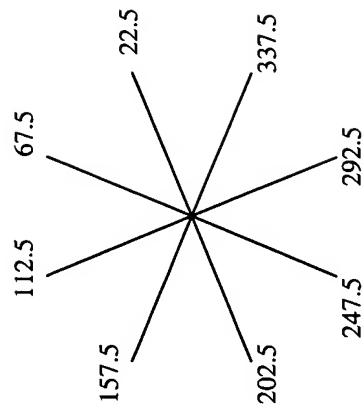


Figure 49C

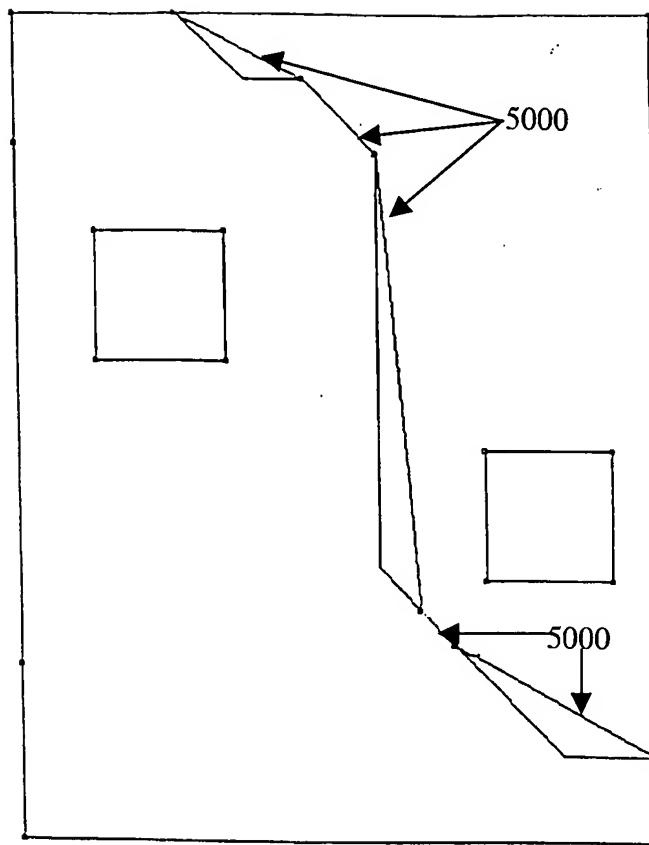


Figure 50

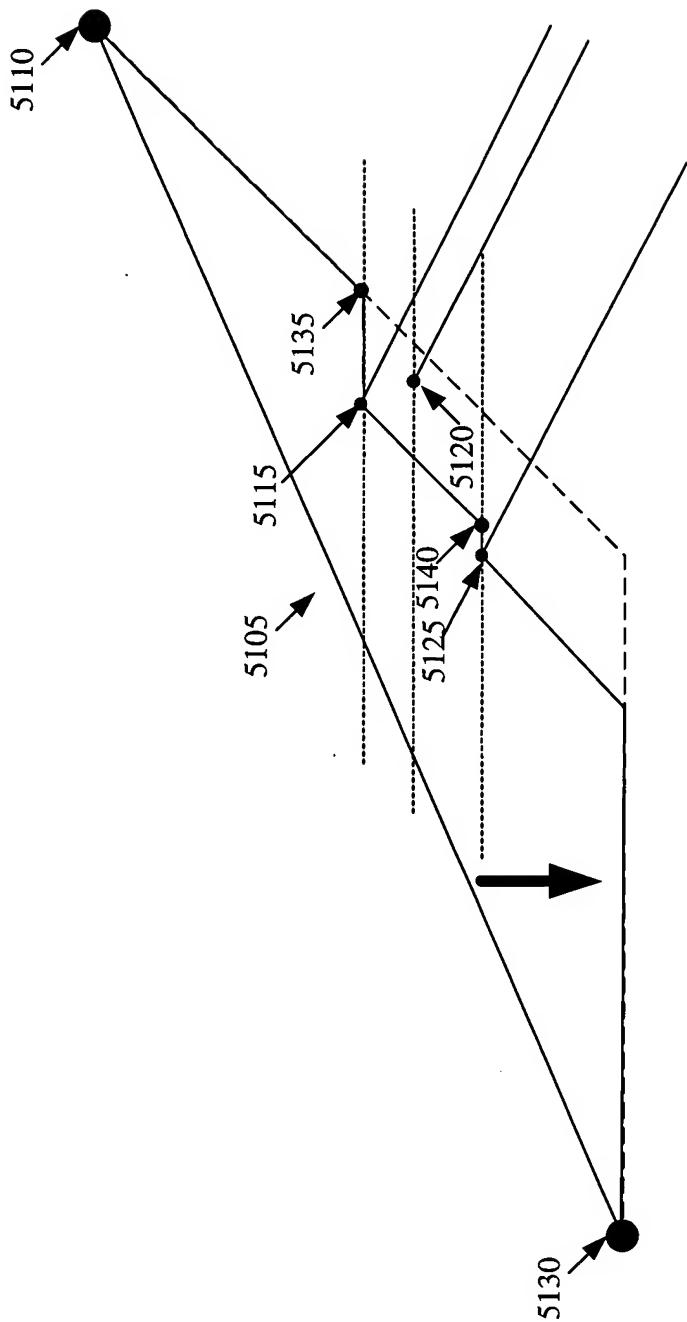


Figure 51

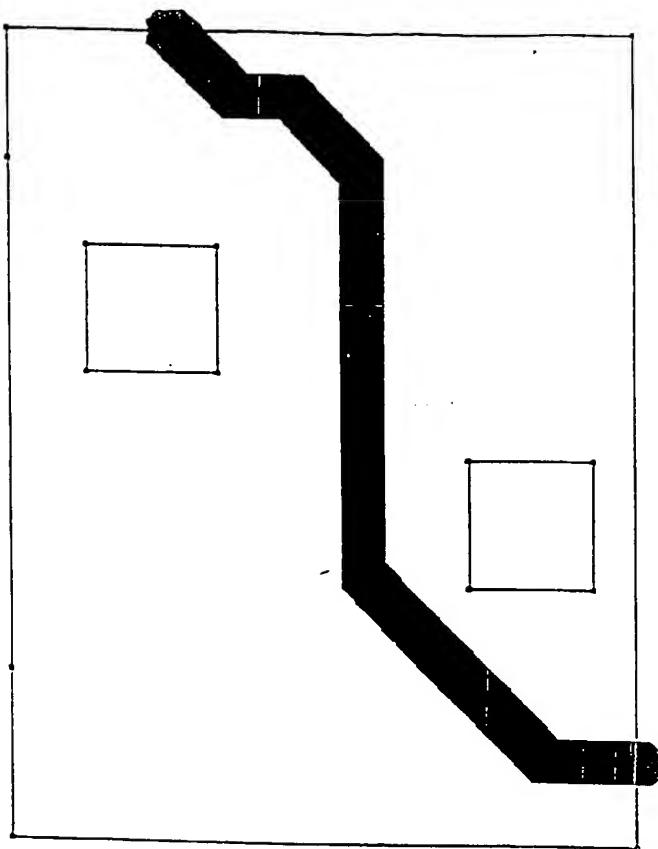


Figure 52

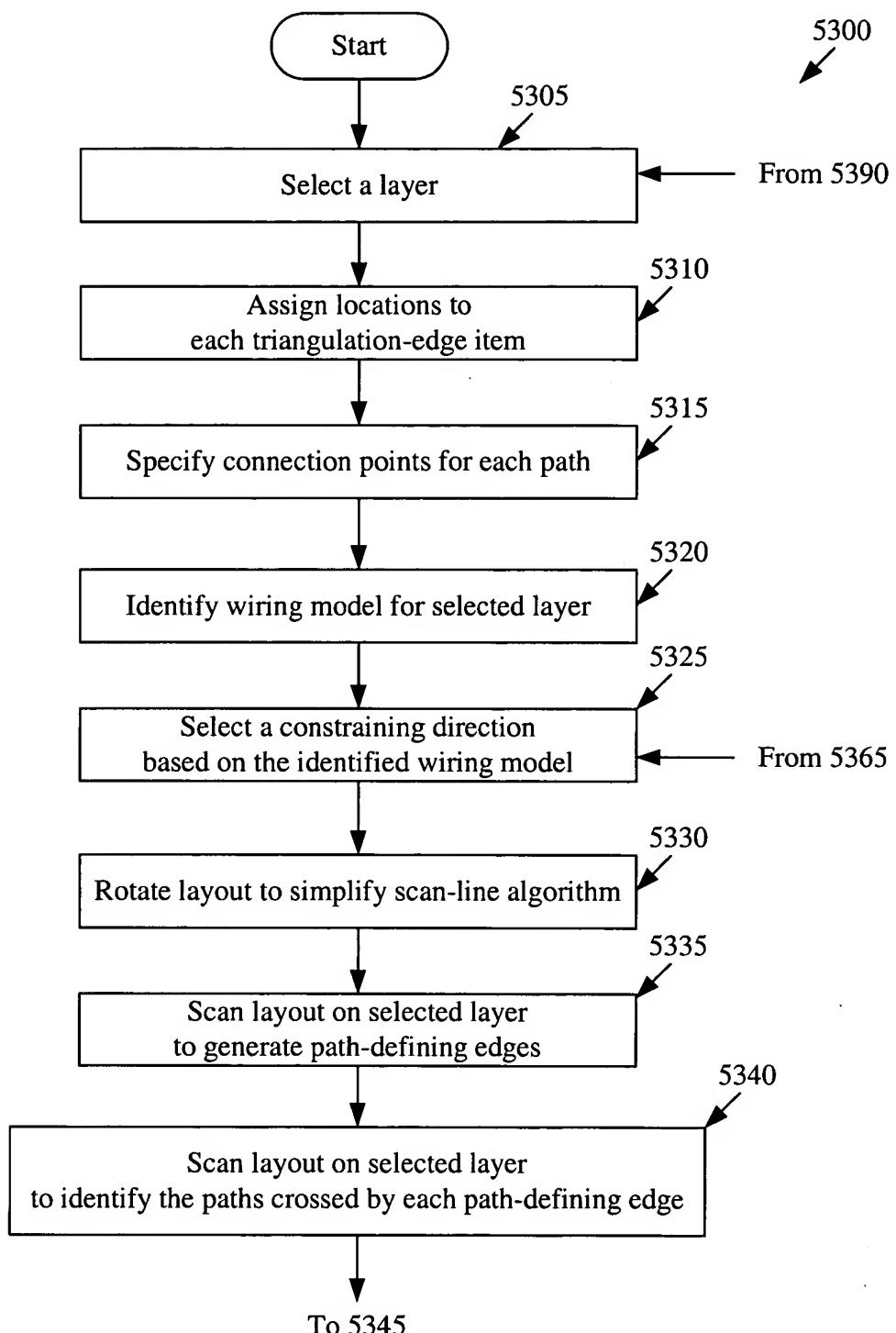


Figure 53A

*Figure 53: Figure 53A
Figure 53B*

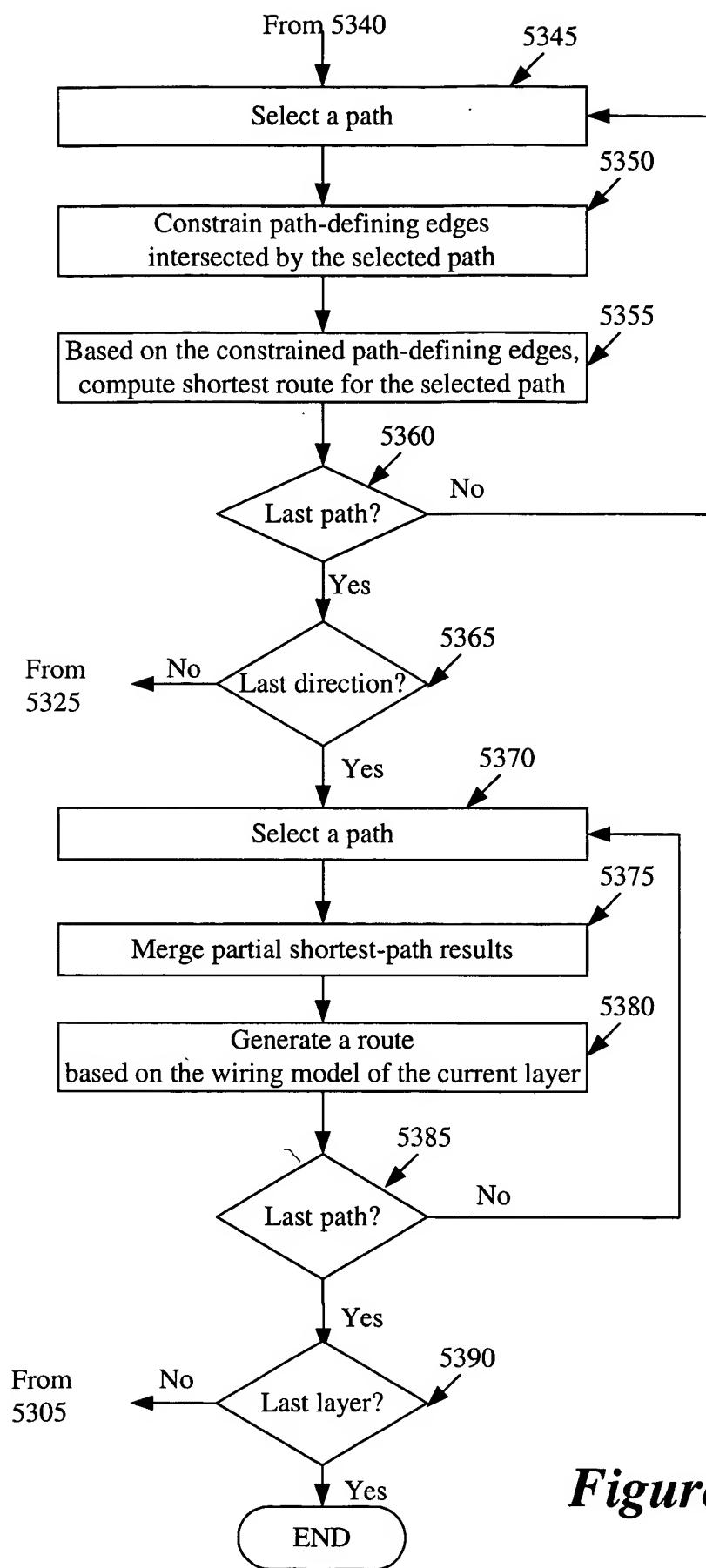


Figure 53B

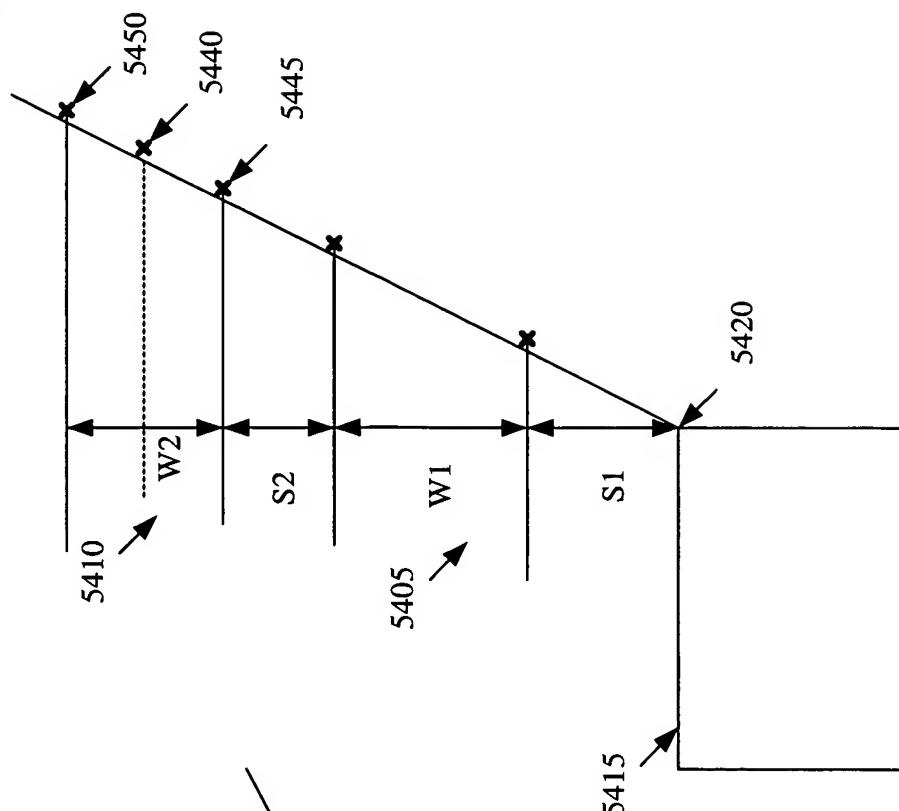


Figure 55

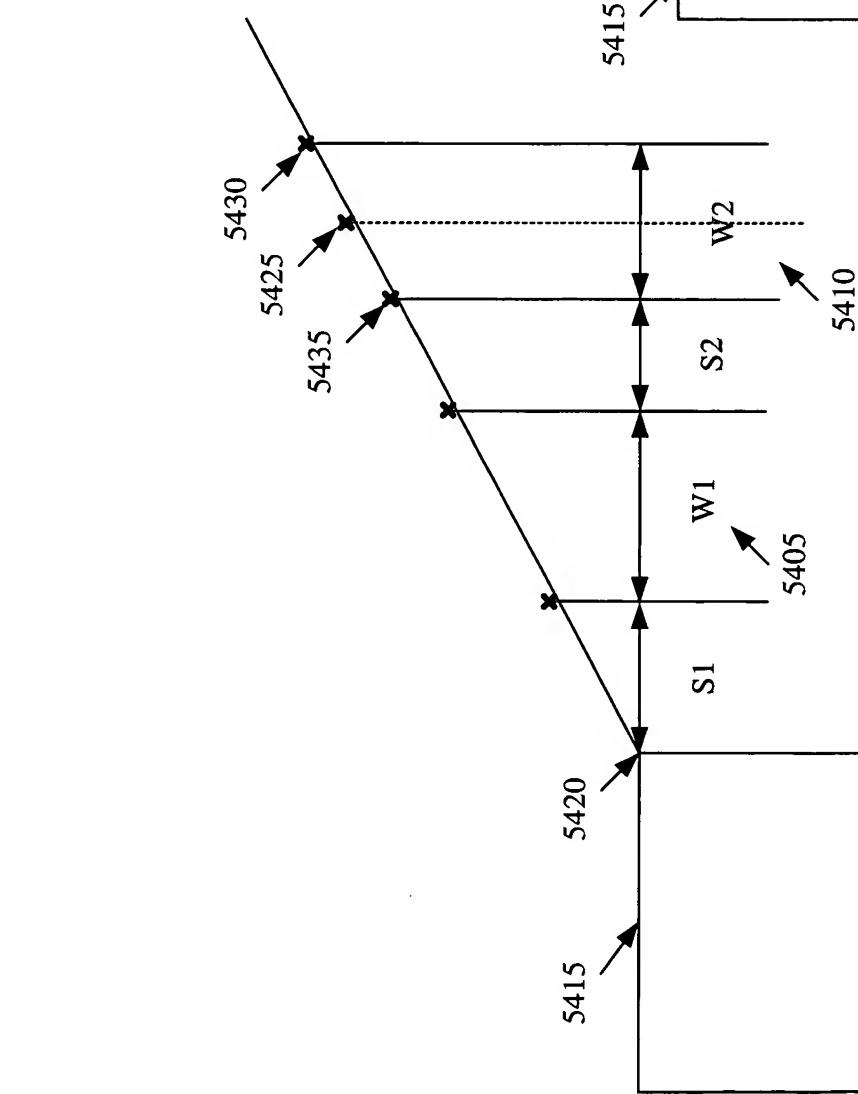


Figure 54

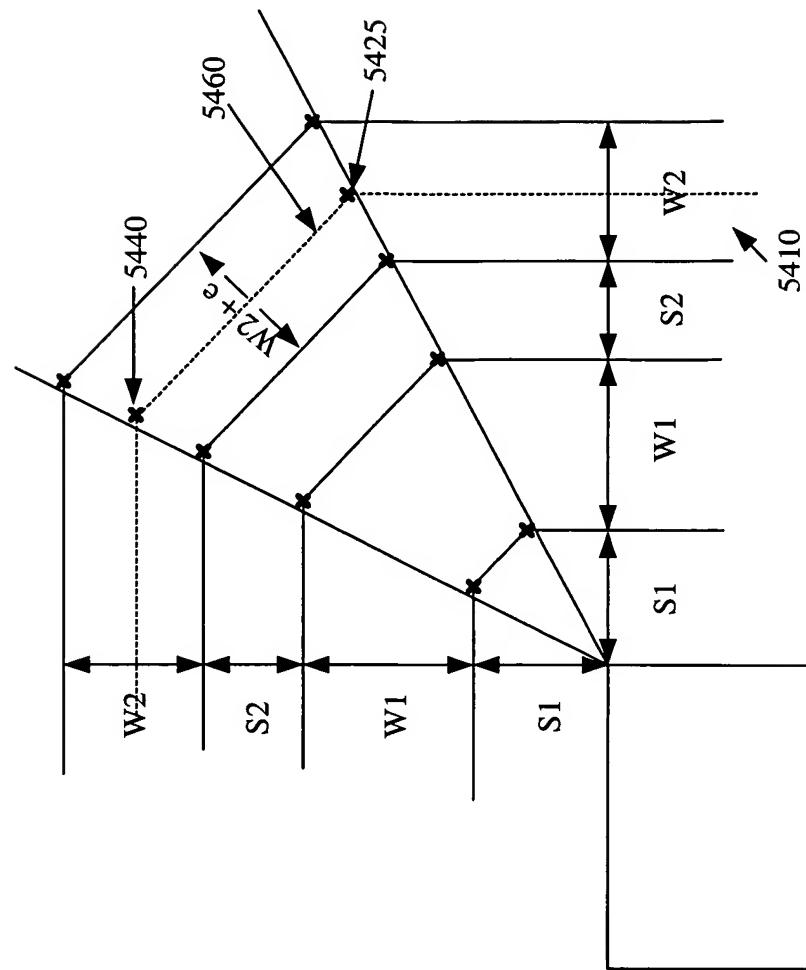


Figure 56

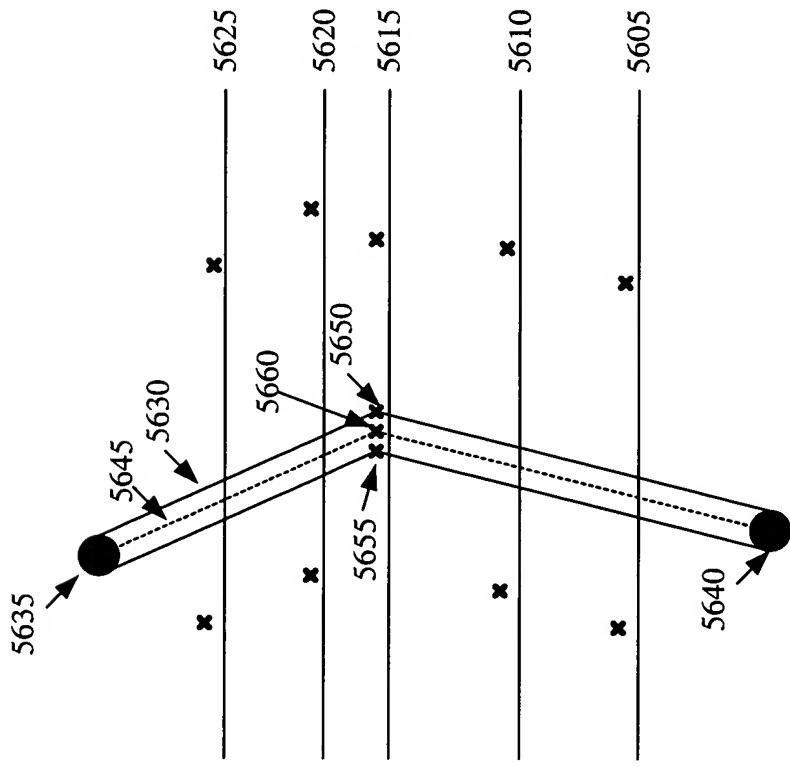


Figure 57

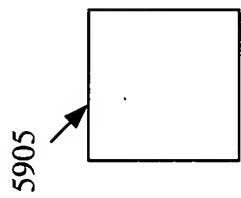
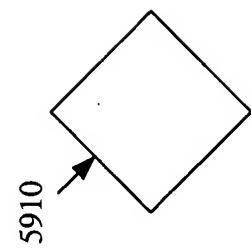


Figure 59

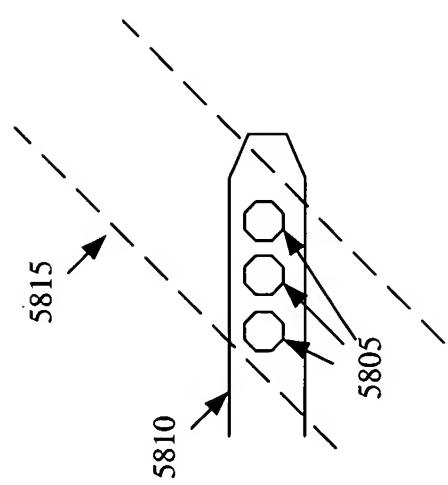


Figure 58

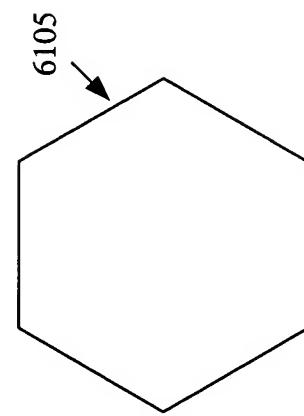
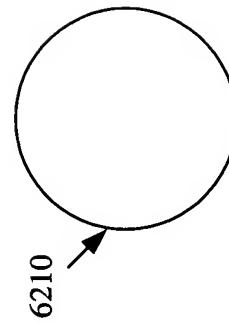


Figure 62

Figure 61

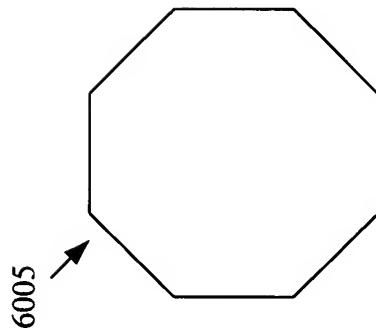


Figure 60

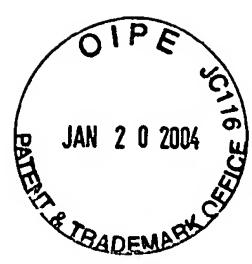


Figure 63

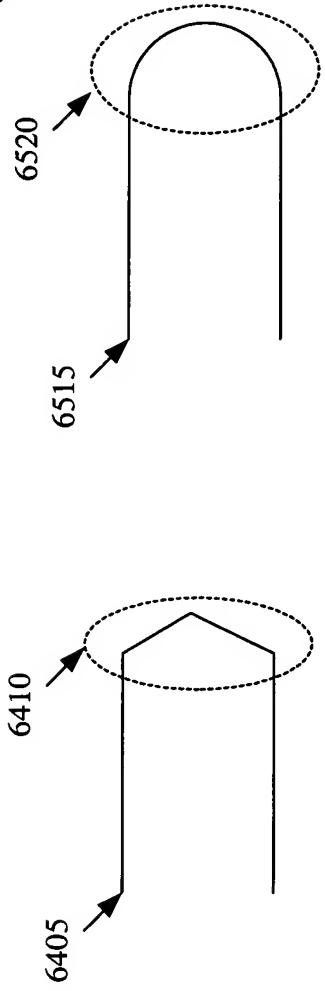


Figure 64

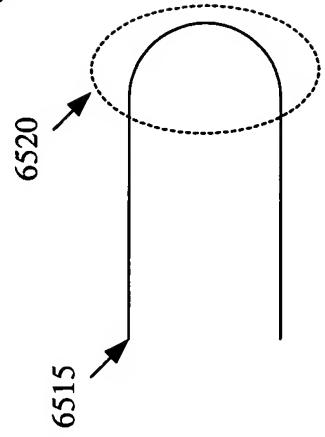


Figure 65

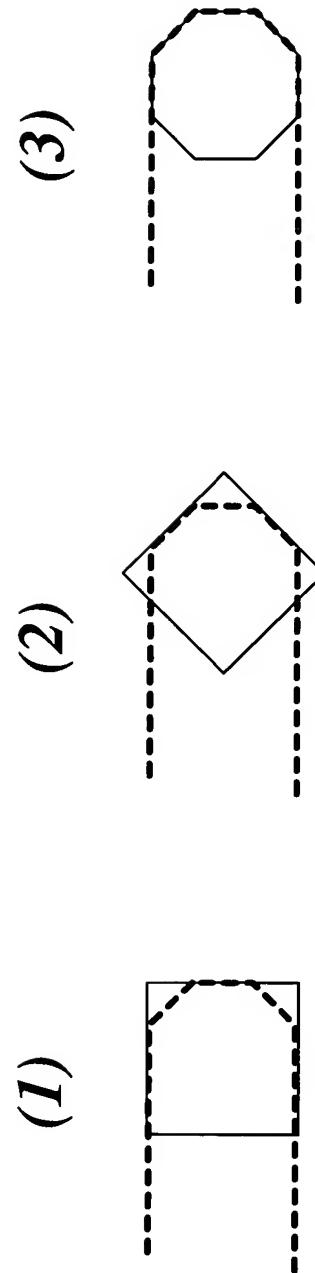


Figure 66



Figure 67

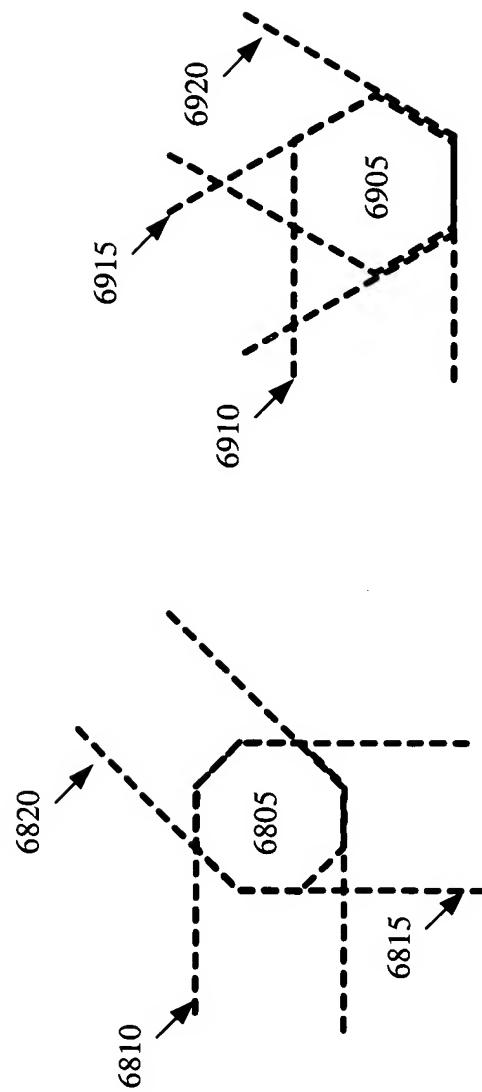


Figure 68

Figure 69

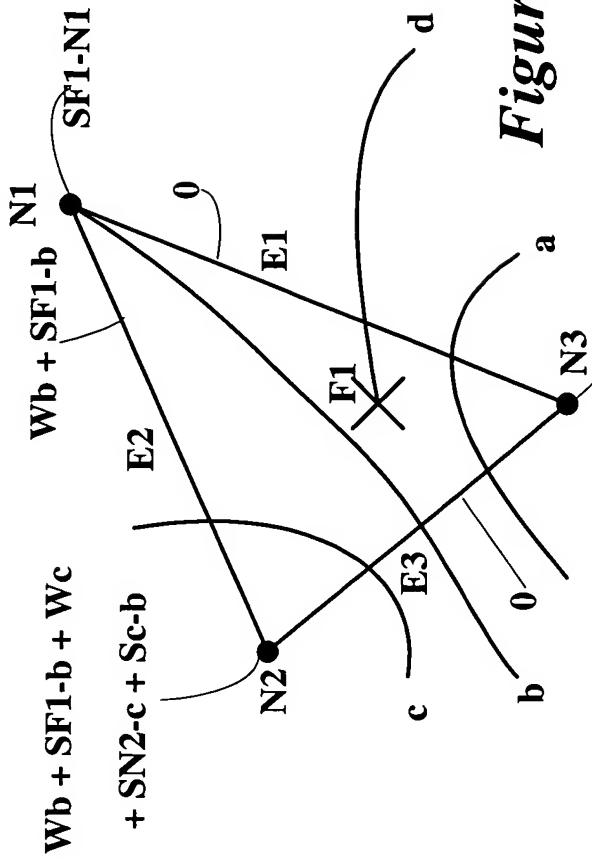
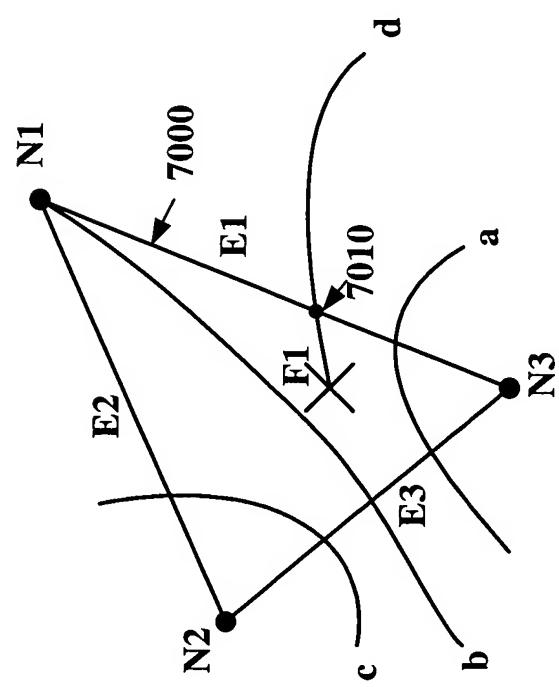


Figure 70

W_a + SN3-a + SF1-a
N1

N1'

W_a

W_b + SF1-b + W_c

+ SN2-c + Sc-b

N1'

SF1-b

7200

N2'

W_a + SN3-a + SF1-a
N3

Figure 72

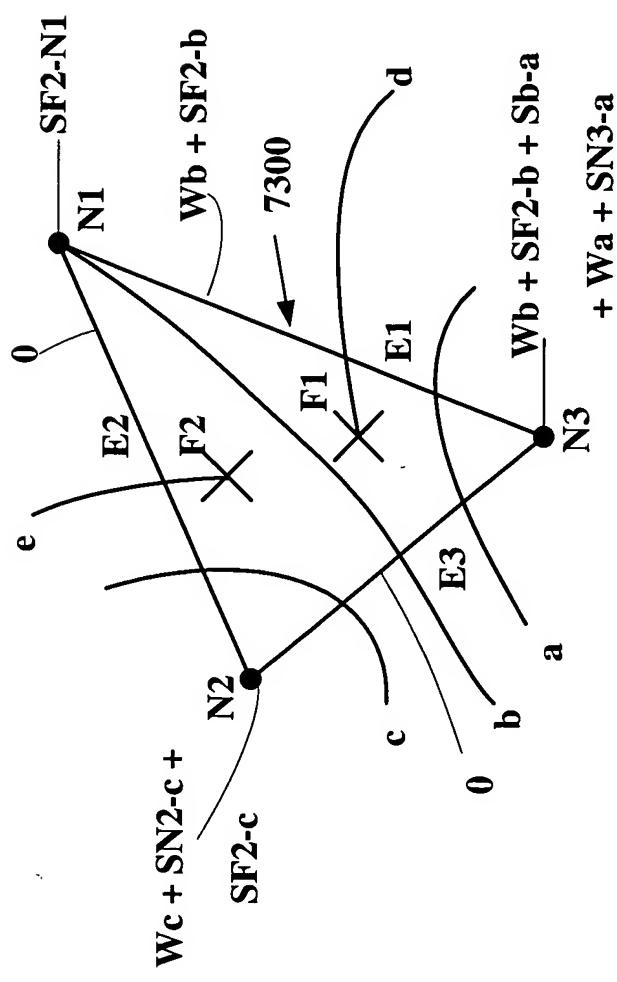


Figure 73

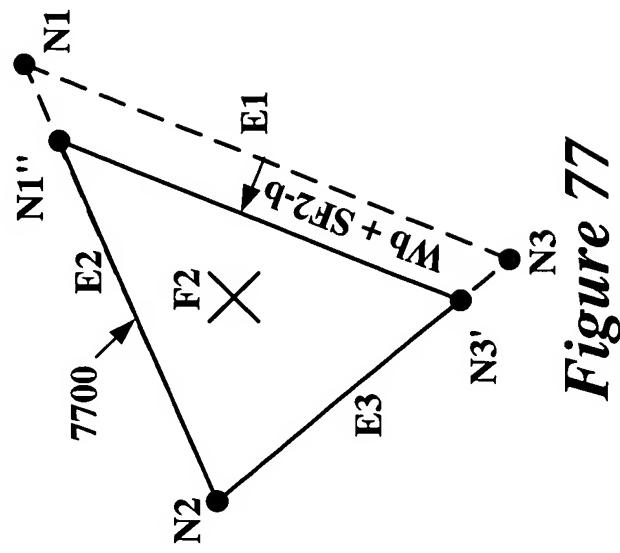


Figure 77

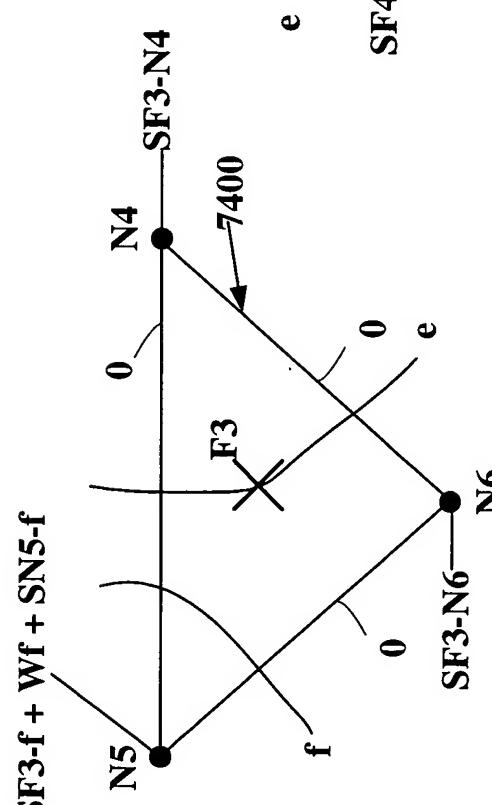


Figure 74

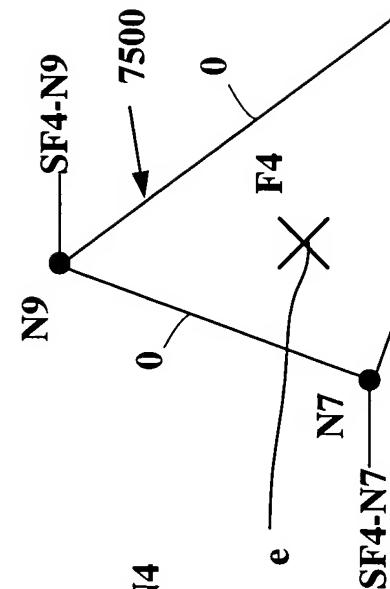


Figure 75

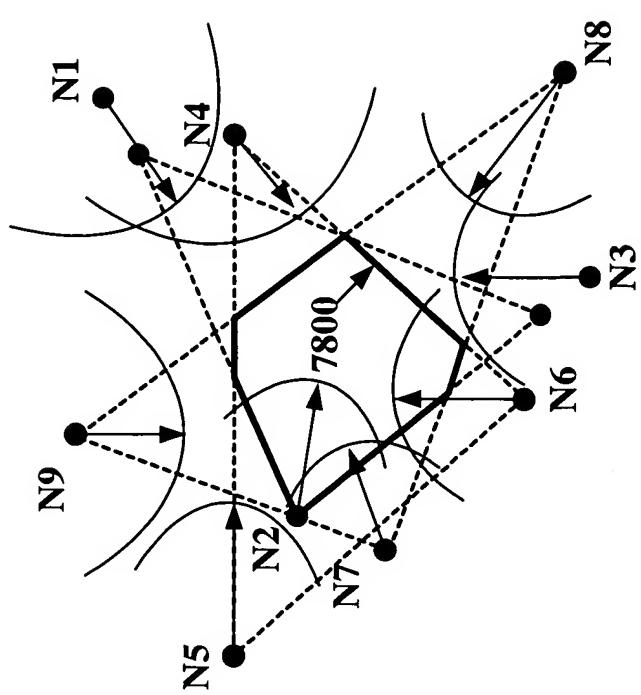


Figure 78

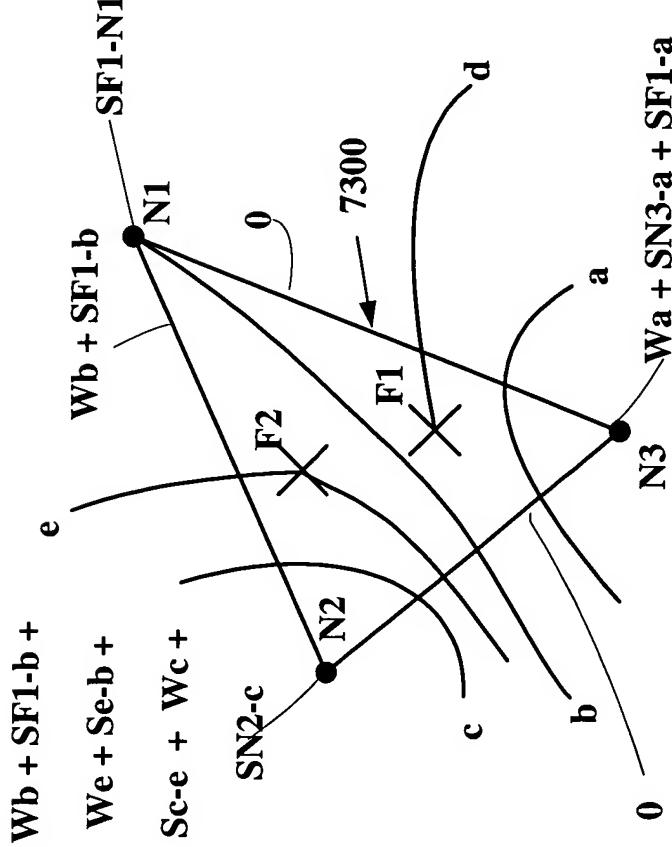


Figure 76

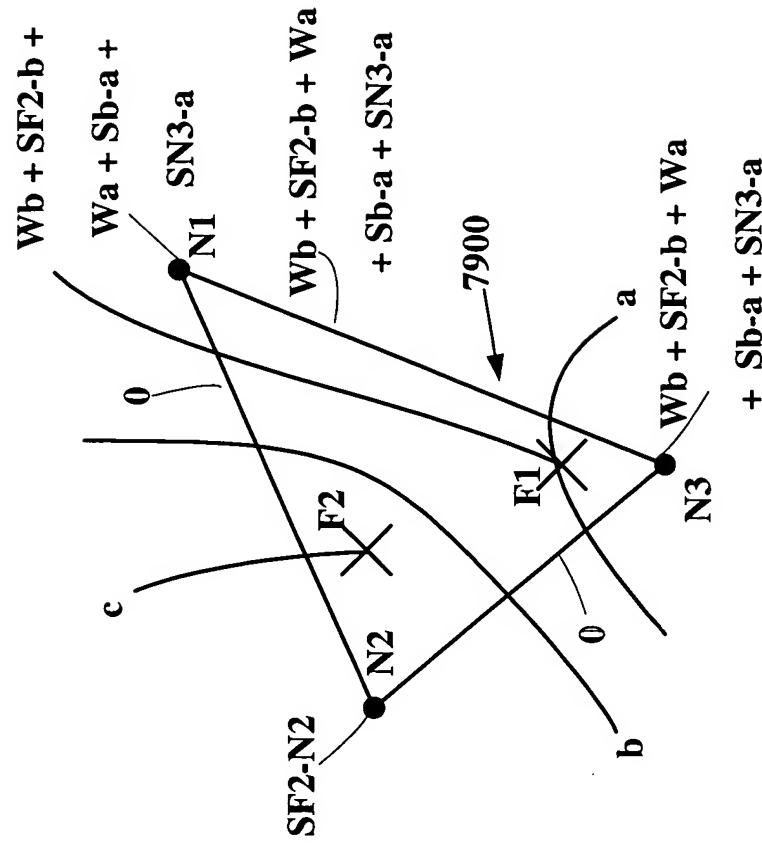


Figure 80

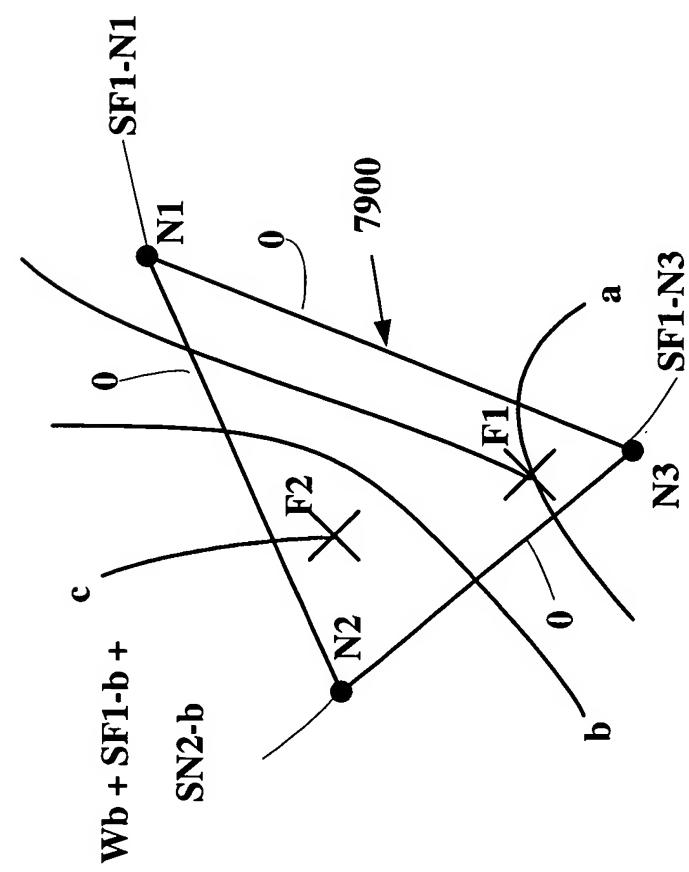


Figure 79

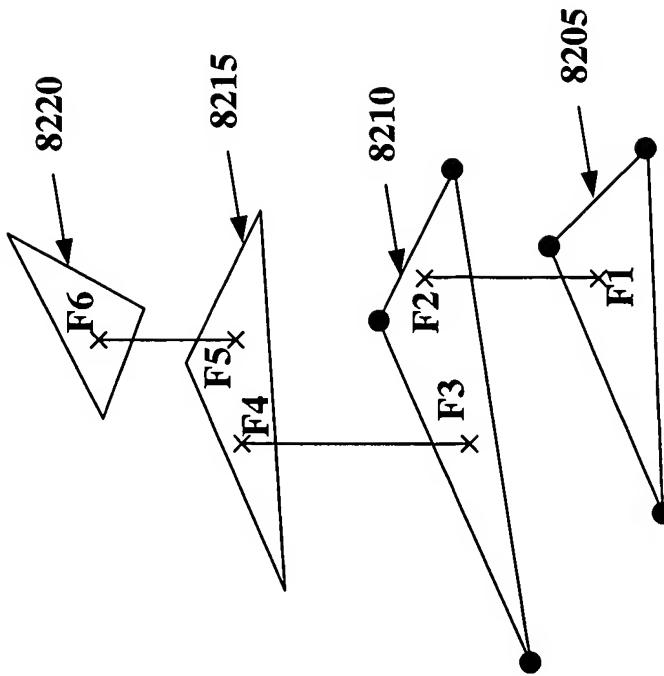


Figure 82

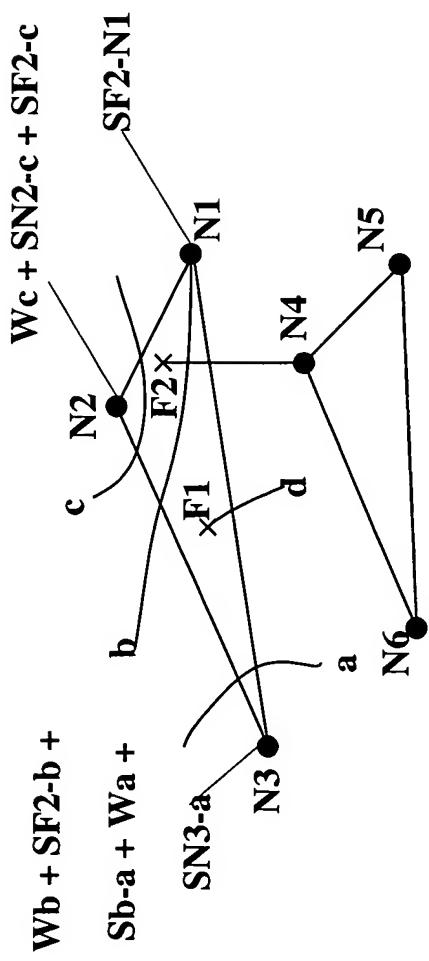


Figure 81

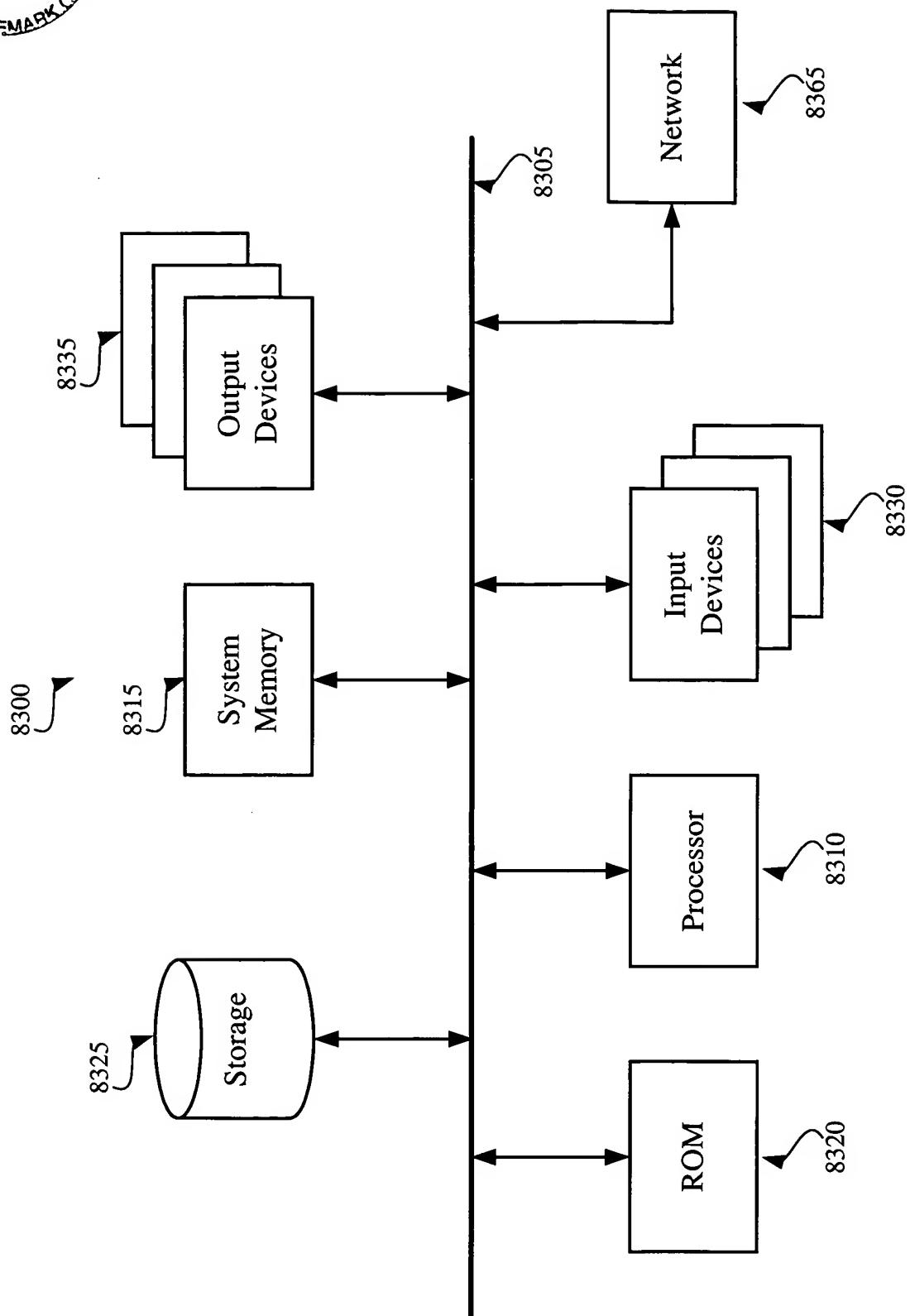


Figure 83